

Claudiu SAVA¹

UNDER MENTORING OF – Col. Assistance Prof. Eng. Tomasz SMAL, PhD.

RESUPPLYING FORWARD OPERATING BASE

Abstract: *This articles' purpose is to present the various challenges that military logistics have to encounter during military operations and the means to supply the forces with the needed supplies at the right time and place. It is important to understand that the outcome of military operations depends not only on the fire power at our disposal, but also on the soldiers morale, which can be enhanced by supplying them with all they need. "By method and discipline are to be understood the marshalling of the army in its proper subdivisions, the graduations of rank among the officers, the maintenance of roads by which supplies may reach the army, and the control of military expenditure".² Sun Tzu, one of the greatest military strategist of all time emphasised the importance of supplies routes, because he knew that it can change the course of a war.*

Key words: *military logistics, supply and resupply chain, JPADS, airdrop, unmanned*

INTRODUCTION

This paper has the purpose of emphasizing the importance of supply operations and the continuous development of all means of supplying.

Nations have the ultimate responsibility for ensuring the provision of sufficient supplies and services to adequately sustain their forces in NATO operations. In the field of supplies, multinational support arrangements can usually be considered for the provision of food, water (bulk and bottled), bulk fuel, some ammunition types and medical supplies. The supplies and services to be provided by multinational logistics will be determined in concert with nations prior to commencement of the operation and will depend on the degree of standardisation and interoperability within the force.

The supply system depends on an efficient and effective materiel management system. Materiel management centres (MMC)s and materiel managers with distribution management centres (DMC)s must know the prioritized requirements of the force and the status of available resources. They manage distribution in coordination with movement control elements that know the capabilities of the transportation system to move required supplies. This management requires an effective automated supply system and extensive coordination³.

¹ Claudiu SAVA - a military student from Romania.

² Sun Tzu, *The Art of War*, Chapter I "Laying Plans".

³ Field Manual No. 4-0, Department of the Army, Washington, DC, 29 August 2003.

1. NATO VIEW REGARDING SUPPLY OPERATIONS

The US DoD defines the concept of supply as: „The procurement, distribution, maintenance while in storage, and salvage of supplies, including the determination of kind and quantity of supplies”⁴. NATO has a slightly different approach regarding the definition, supply being defined as “the procurement, reception, storage, transportation, distribution, maintenance, reclamation and disposal of supplies, including determination of type and quantity in each instance. Supply covers all materiel and items used in the equipment, support and sustainment of military forces”⁵. As we can see, NATO has a more comprehensive definition of supply concept, because opposed to the first definition, it includes reception, storage, transportation and even reclamation and disposal of supplies. In many civilian dictionaries, the term „supply” is defined as the ability to provide something that is needed. One of the first tasks of logistics is to identify the needs of the units that are to be supplied.

Resupply: The act of replenishing stocks in order to maintain required levels of supply⁶. Resupply operations can be described as routine, emergency, and prestock. Each methods developed in the unit SOP and rehearsed in training. In order to accelerate the process of supplying, NATO had to divide all supplies in different classes (Tab.1). The division of supplies in classes is also important for creating interoperability between the NATO members.

Tab. 1. NATO classes of supply⁷

NATO classes of supply	Description
I	Items of subsistence, e.g. food and forage, which are consumed by personnel or animals at an approximately uniform rate, irrespective of local changes in combat or terrain conditions.
II	Supplies for which allowances are established by tables of organisation and equipment. E.g. medical stores (drugs, blood,) and equipment (clothing, weapons, vehicles....) and spare parts.
III	Petroleum, oil and lubricants (POL) for all purposes, except for operating aircraft or for use in weapons such as flame-throwers, e.g. gasoline, fuel oil and greases. (Class III A: Aviation fuels and lubricants).
IV	Supplies for which initial issue allowances are not prescribed by approved issue tables. Normally includes fortification and construction materials, as well as additional quantities of items identical to those authorised for initial issue (Class II), such as additional vehicles.
V	Ammunition, explosives and chemical agents of all types.

⁴ Department of Defense Dictionary of Military and Associated Terms, p. 276.

⁵ Land Forces Logistic Doctrine, ALP-4.2 (A) February 2010,chapter V, section 1.

⁶ AAP-6,NATO Glossary of Terms and Definitions, p.303.

Land Forces Logistic Doctrine ALP-4.2 (A), February 2010,chapter V, section 2.

2. MEANS OF RESUPPLYING FOB (Forward Operating Base)⁸

FOBs require frequent resupply of fuel, ammunition and supplies by air. The airfields associated with these bases, often in mountainous terrain, have, in some cases gravel or dirt runways. FOBs are traditionally supported by Main Operating Bases that are required to provide backup support to them. A FOB also improves reaction time to local areas as opposed to having all troops on the main operating base. In its most basic form, a FOB consists of a ring of barbed wire around a position with a fortified entry control point, or ECP. More advanced FOBs include an assembly of earthen dams, concrete barriers, gates, watchtowers, bunkers and other force protection infrastructure.

2.1. Airdrop resupplying

Airdrop resupply is classified into four types: free-drop, high-velocity, low-velocity, low-altitude parachute extraction (Fig. 1):

a) Free-drop. This type of airdrop is used infrequently, especially when airdrop equipment is readily available. Parachutes or other devices to slow the rate of descent of the supplies are not used. Some type of energy-dissipating material, such as honeycomb, may be placed around the supplies to lessen the shock when the load hits the ground. The load descends at a rate of 130 to 150 feet per second. Baled clothing and fortification and barrier materials are examples of non-fragile items that can be free-dropped successfully.

b) High-velocity. High-velocity airdrop uses a small parachute that generates enough drag to hold the load in an upright position during its descent at 70 to 90 feet per second. Items are placed on energy-dissipating material and rigged in an airdrop container. Subsistence items, packaged POL products, ammunition, and similar items may be delivered by this type of airdrop.

c) Low-velocity. Low-velocity airdrop can be used for all supplies and equipment certified for airdrop. Cargo parachutes reduce the rate of descent to no more than 28 feet per second. Depending on the weight of the load, one to eight parachutes are used. Items are rigged on an airdrop platform or in airdrop containers. Energy-dissipating material is placed under the supplies or equipment to reduce the shock when the load hits the ground. Fragile materiel, vehicles, bridging, and artillery may be airdropped by low-velocity techniques.

d) Low-altitude parachute extraction. LAPE airdrop is used to airdrop supplies and equipment from an aircraft flying about 5 to 10 feet above the ground. The load is rigged on a specially configured airdrop platform. Energy-dissipating material is placed under the load to reduce the shock when the load hits the ground. As the aircraft flies across the drop area, the load is extracted using one to three LAPE parachutes. The load falls at about 28 feet per second and slides across the extraction zone. The LAPE parachutes keep the load aligned with the extraction zone, prevent tumbling, and help slow the forward momentum. LAPE airdrop requires a relatively flat, smooth area requiring special preparations before it can be used.

⁸ Definition: "A base usually located in friendly territory or afloat that is established to extend command and control or communications or to provide support for training and tactical operations. Facilities may be established for temporary or longer duration operations and may include an airfield or an unimproved airstrip, an anchorage, or a pier. A forward operations base may be the location of special operations component headquarters or a smaller unit that is controlled and/or supported by a main operations base." *Department of Defense Dictionary of Military and Associated Terms*, November 2010, p.115.



Fig. 1. Types of airdrop⁹

2.3. Helicopter resupply

There are two types of helicopters:

a) Utility helicopters (UH). A UH is a general-purpose aircraft with limited carrying capability. It is used for such missions as transport of troops, cargo, or patients. Two Army helicopters are of this type; the UH-1H Huey can carry approximately 2,250 pounds externally, the UH-60A Blackhawk up to 8,000 pounds.

b) Cargo helicopters (CH). The CH has the capacity for carrying greater weights and sizes than those carried by the UH. It can lift heavy, oversized loads, such as artillery pieces and ammunition. It can recover downed aircraft or vehicles. There are two CHs, the CH-47 Chinook and the CH-53E Super Stallion. The Chinook is the Army's primary CH. It can carry a maximum external load of 26,000 pounds. The Super Stallion is the primary CH of the USMC and USN and can lift up to 36,000 pounds on an external single-point cargo hook (Fig. 2).

⁹ *FM 10-500-1, Airdrop Support Operations in a Theater of Operations*, Department of the Army, Washington, DC, 19 June 1991.

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Fig.2. CH-47 Chinook conducting resupply operation¹⁰

Lockheed Martin have created a remote-controlled helicopter for dangerous supply missions in Afghanistan and it has been so successful that the project has been extended indefinitely (Fig. 3).

Two K-MAX unmanned helicopters have flown over 1,000 missions and hauled over 3 million tons of supplies for the United States Marines in the last year. As with other drones, such as Predator, a ground station operator can remotely fly the K-MAX via a satellite link. Even better, the K-MAX can be pre-programmed to lift off with multiple loads on its four-hook carousel, fly to remote locations and drop off loads at four different locations.

The unmanned helicopter can lift 4,300 pound loads up to 15,000 ft.; only a Chinook helicopter can lift heavier loads at higher altitudes, said Terry Fogarty, Kaman general manager. In tests at Yuma proving grounds it flew with a 1,500 pound load up to 17,000 ft.¹¹



Fig.3. K-MAX unmanned helicopter conducting resupply operation¹²

¹⁰ <http://www.25idl.army.mil/deployment/oef%20afghanistan/deployment/15nov04pictures.htm> (07.05.2013).

¹¹ *Unmanned Resupply Helicopter Can Fly Sling Loads to Multiple Remote Locations*, <http://defensetech.org/2010/05/03/unmanned-resupply-helicopter-can-fly-sling-loads-to-multiple-remote-locations/> (04.05.2013).

¹² *Lockheed Martin Offers Rugged Unmanned K-MAX for USMC Cargo Resupply*, <http://www.lockheedmartin.com/us/mst/features/2010/101021-lockheed-martin-offers-rugged-unmanned-k-max-for-usmc-cargo-resu.html> (05.05.2013).

2.4. Convoy resupply

A group of vehicles organized for the purpose of control and orderly movement with or without escort protection that moves over the same route at the same time and under one commander¹³. This type of resupplying operation is the most dangerous because roads may contain IEDs. In Afghanistan, the improvised explosive devices are the cause of death for the most soldiers deployed there.



Fig.4. Convoy conducting resupply operation¹⁴

2.5. Future means of resupply

Today's new face of the battlefield made military logisticians aware of new challenges that must be overcome. In the field of supplying and resupplying, logisticians needed to find a safe, precise, fast and low-cost mean of conducting this kind of operations. Therefore a new system was created by enhancing the airdrop capabilities and this is JPADS (Joint Precision Airdrop System). JPADS provides improved precision capability, ensuring an accurate delivery of supplies to the forward-operating forces, reducing vehicular convoys, and allowing aircraft to drop cargo at safer altitudes and offset distances (Fig. 5).

¹³ Department of Defense Dictionary of Military and Associated Terms, November 2010, p.62.

¹⁴ <http://www.bfgnet.de/Home20/Herrick/26reg.html>.

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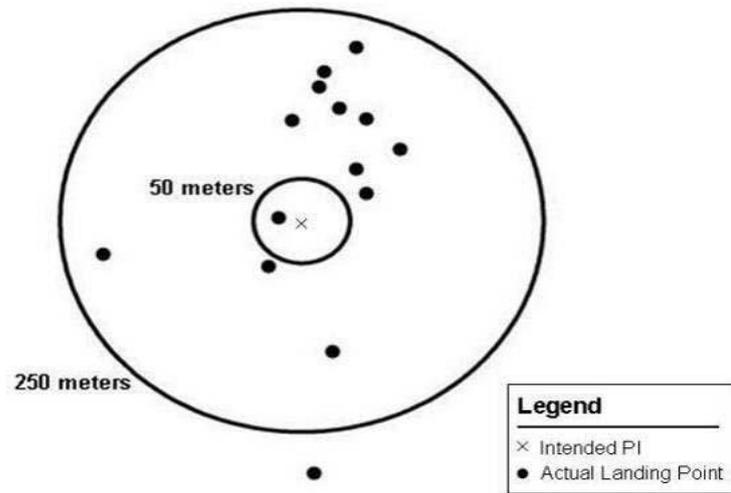


Fig.5. Accuracy Plot of Payload Landing Relative to PI¹⁵

The JPADS is a precision-guided airdrop system that provides rapid, precise, high-altitude delivery capabilities that do not rely on ground transportation. The system ensures accurate and timely delivery in support of operational missions, while providing aircraft with increased survivability (Fig. 6)¹⁶. JPADS is a family of systems consisting of self-guided cargo parachute systems (Army lead), and a common laptop mission planning (MP) and weather system (USAF lead) with numerous additional partners. The JPADS family includes (Fig. 7):

- JPADS Extra Light (XL) weight range: 700-2,400 lbs;
- JPADS-Light (L): 5001 lbs-10K lbs: Currently an ACTD;
- JPADS-Medium (M): up to 30K lbs, a US Army Technology Objective (ATO);
- JPADS-Mission Planner (MP)¹⁷.



Fig. 6. 1st USAF/USA Combat JPADS airdrop in Afghanistan¹⁸

¹⁵ 19th AIAA Aerodynamic Decelerator Systems Technology Conference and Seminar 21 - 24 May 2007, Williamsburg, VA.

¹⁶ US Army, *Army weapon systems handbook*, 2012, p. 192.

¹⁷ 19th AIAA Aerodynamic Decelerator Systems Technology Conference and Seminar 21 - 24 May 2007, Williamsburg, VA.



Fig. 7. USAF JPADS-MP primary components and carrying case¹⁹

JPADS has a wide range of benefits: Mitigates time and distance barriers (Global reach, Extended/Non-Contiguous Battlespace); Increase aircraft, aircrew, load survivability; Allows multiple loads to multiple destinations from one release point; Minimized risk of detection of the troops on the ground; Permits smaller, more numerous DZs (Drop Zones) which means less ground to mark and secure, and also less risk of unit or DZs detection.

NATO is still improving airdrop capabilities by developing a Wireless Gate Release System (WGRS) that enables the load master to present the delay between containers, in order that this containers will not collide during descending.

CONCLUSIONS

We can conclude by acknowledging the importance of supplying and resupplying, which are of vital importance for the success of military operations. Fighting forces need the basic supplies in order to maintain their battle readiness and awareness, without them forces will be unable to complete their mission.

Logisticians integrate the three functional capabilities of managing supplies and equipment, managing inventory, and managing supplier networks within the supply core logistic capability. Visibility of requirements and demands is critical for supplies and it requires communication and integration with other areas affecting the supply chain, maintenance, and distribution.

It is very important to develop new means of supplying troops without any time or distance barriers and with minimized risks for the units involved in supply operations. Logisticians need to forecast future supply capability needs because technology is evolving and the battle space is in a continuous transformation.

As presented in this paper, supplying operations for FOBs can be conducted by air (airdrop, helicopters) and by land (vehicular convoys). The most used method is by air,

¹⁸ *Ibidem.*

¹⁹ 19th AIAA Aerodynamic Decelerator Systems Technology Conference and Seminar 21 - 24 May 2007, Williamsburg, VA.

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because it reduces the risk of exposing to damage inflicted by insurgent's weapon of choice which is the IED (Improvised Explosive Device).

REFERENCES

1. Land Forces Logistic Doctrine, ALP-4.2 (A) February 2010, chapter V, section 1.
2. Department of Defense, *Dictionary of Military and Associated Terms*.
3. AAP-6, *NATO Glossary of Terms and Definitions*.
4. JSP 886, *Defence Logistics Support Chain Manual*, Volume 7, Supportability Engineering, Part 8.10, Supply Support.
5. FM 10-500-1, *Airdrop Support Operations in a Theater of Operations*, Department of the Army, Washington, DC, 19 June 1991 .
6. 19th AIAA Aerodynamic Decelerator Systems Technology Conference and Seminar, 21 - 24 May 2007, Williamsburg, VA.
7. US Army, *Army weapon systems handbook*, 2012, p. 192.
8. <http://defensetech.org/2010/05/03/unmanned-resupply-helicopter-can-fly-sling-loads-to-multiple-remote-locations/>.
9. <http://www.lockheedmartin.com/us/mst/features/2010/101021-lockheed-martin-offers-rugged-unmanned-k-max-for-usmc-cargo-resu.html>.
10. <http://www.bfgnet.de/Home20/Herrick/26reg.html>.
11. <http://www.25idl.army.mil/deployment/oef%20afghanistan/deployment/15nov04pictures.htm>.