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GREEN APPLICATIONS IN MILITARY LOGISTICS

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Abstract:
Among the threats to national security often not spoken about, or mentioned as an afterthought, are the threats and risks linked to environmental issues. This study assumes that, in the future, the worst threat will be environmental, either deriving from scarce resources such as water, energy dependence or even pollution. Most of the pollution around the world is being caused by logistic transportation. This study focuses on what is being done and can be done with military logistics in order to help fighting against this future threat.

Key words: threats, green, logistics, military, fuel, ammunition

1. Introduction

Any soldier's main purpose is to protect his/her people from threats. The exact meaning of threat changes in time and place, but this main purpose of soldiers, remained the same all the time: Protecting people from threats. Today soldiers around the world, putting some kind of technological weapons in use, keep on trying to protect their respective nations from what they consider as threats.

Lets keep our focus on the threats. Every nation have different visions of threats. Strategist may imagine what will be a threat in 2020. May it be a conflict for energy or water, or waste? Imagine a country which pollutes the air of another unintentionally. What about 2060 or the end of 22nd century? As time passes by new theories will emerge about this, new threat scenarios will emerge, the profession of military will continue its transcendence.

Another threat for people is being announced as environmental issues. There are many institutions working on that, trying to make people understand the reasons and effects of pollution.

This study assumes that, in the future, the worst threat will be environmental. Most of the pollution around the world is being caused by logistic transportation.[1] This study focuses on what is being done and can be done with military logistics in order to help fighting against this future threat.

2. Green Logistics

The military operations are not exempted from having environmental implications, just like any other industry. There are several ways the military can impact the environment:

- through pollution of the air, land, and water in peacetime, as a result of training exercises and the functioning of the military system

- the immediate and long-term effects of wars and armed conflict, from a huge consumption of fuel to the use of chemicals as a tool of war, to landmines and unexploded ordnance

- through the development, production and even use of nuclear weapons (even if "only" for testing purposes)

-through the land use, which means that those areas may incur the risk of pollution (for example in multipurpose training ranges) or are taken out of the use for civilian purposes.

The word Logistics comes from old Greek words logos and ikon. Logos means "the right thought and movement" and "calculation". Ikon means picture. Then we can say that logistic means calculation via pictures. This word was first used by Pythagoras' who said that he'd learned the science from Finikeliler.

Modern usage of the word "logistics" means a process starting from raw material, includes the processes of production, and ands with the product's final destination: the user. The raw material consumes energy and gains value during its journey through logistics chain, while unintentionally and inescapably producing waste. the waste produced by logistic chain can be listed as:

- Gathering raw materiel: Wilderness area destroyed while building gathering facilities, gathering process energy wastes, side wastes produced during raw materiel handling, etc.

- Production: Wilderness area destroyed while building production facilities, production process energy wastes, and water and air pollution during production, package wastes, etc. The military, in the course of their operations, generated byproducts that may require considerable costs to dispose of. For instance, after the US closed in 1992 the Subic Naval station and Clark Air Base, a WHO report [2] identified various environmental destructive practices that affected the sites, including dumping of toxic waste that included lead and aviation fuel, accidental spills from underground storage tanks and contamination of sewage, and even unexploded ordnance and radioactive materials.

The costs involved by the clean-up of soil and groundwater pollution in the US bases overseas is significant, estimated at more than 3 billion USD [3], which explains why usually the governments (US and the host nation) are many times reluctant to clearly admit the responsibility for the environmental damage and cover the clean-up costs.

- Transportation: Transport vehicles' energy wastes, direct effects of transportation to the environment (water transferred between sea areas by the ships, railway-caused forest fires, forests being cut to make new roads, etc.)

In an attempt to become more environmentally friendly and increasing its awareness about the implications of its activity, the French Ministry of Defense took measures to reduce to the minimum the unnecessary travel, by installing in 2010 a number of 236 VTC [4] posts, in order to facilitate virtual face to face meetings and reduce the environmental impact of travel (an at the same time the travel and accommodation costs for the personnel participating to the conference). The Ministry of Defense also issued a regulation forbidding the use of civilian airlines in order for the military personnel on official mission to travel to cities less than three hours away by train, in order to lower the environmental footprint. Military personnel are also encouraged to practice car-pooling for professional travel, mentioning statistics according to which 2.1% of the cars purchased or rented in 2010 were responsible for emissions of 130 g/CO2/Km [5].

- Consumption: Package wastes produced after consumption of goods, recycling process wastes, etc.

Hydrocarbons and nitrogen oxide produces by fossil energy usage is responsible for most of the air pollution. [6] Effects of those kind of wastes have been widely known by people thanks to communication technologies, letting people have an understanding of environmental issues. Some researches show that transportation means with less carbon footprint [7] is being chosen widely. [8] Nowadays there are TV advertisements of facilities that are reducing their carbon footprints.

3. Green Logistics in Military

Environmental care of military can be seen in the cooperative services program (LP) of NATO Support and Procurement Agency (NSPA). NSPA LB is committed to achieve the highest standards of environmental performance, preventing pollution and minimizing the impact of services and activities on the environment. [9]. The two product that militaries use has the worst effect on the environment are fuel and ammunition.

3.1. Fuel

Merchant vessels navigate on the shortest available route with optimum speed while navy ships' consumption increases by navigating fast and maneuvering a lot. Also consumption of a bus and a tank cannot even be compared. Of course there are much more busses around the world than the tanks, or merchant vessels than navy ships, but there should be some care. The motor types below [10] are being used to prevent unnecessary pollution, and can be used by vehicles on land and on the sea(not in the air, not yet, but there are new techniques to prevent pollution in space operations).

3.1.1. Battery Electric vehicles (BEV)

This kind of vehicles uses the energy of their batteries which can be charged by another energy source. there were more BEVS sold than fossil fuel vehicles at the end of 19th century. Vehicles produced by General Electrics (GE) in 1990s were pulled back because of high maintenance costs. Today they are being widely used again. Conventional submarines still use that kind of energy below surface.

3.1.2. Hybrid Electric Vehicles (HEV)

The first vehicle was manufactured by Honda in 1999. Just like a BEV the main propelling energy comes from a battery, and an internal combustion motor charges that battery. Some of the Royal Navy's DUKE class destroyers have been equipped with this kind of machines, o be used in low speeds. Same modernization is also planned for US NAVY's ARLEIGH BURKE class destroyers. Some amphibious assault vehicles are operated with electric motors, the energy of which is gathered from diesel generators on-board.

3.1.3. Plug-in Hybrid Electric Vehicles(PHEV)

These vehicles have bigger batteries that can also be recharged with cable. Initially manufactured by GE, they seem to replacing HEV's.

3.1.4. Hydrogen Based Fuel Cell Electric Vehicles (FCEV)

This kind of vehicles' trials are still being made by Toyota and Honda, and have travelled totally 3M km's. Hyundai started production in 2014, Mercedes, Ford and Nissan are expected to start in 2017. Germany uses HYDRA class boats and TYPE 212 class submarines powered with FCEV. [11]

3.1.5. Other Alternative Energies for Vehicles

According to the writer, the best way to navigate on the sea is with the wind. There are also some aircrafts using solar energy. But as for now these are not enough for military usage and out of the topic. Other alternatives can be usage of natural gas or bio-diesel in internal combustion motors. US NAVY assigned the Great Green Fleet starting from January 2016 in Pacific, which use some kind of bio-diesel as fuel. [12]

3.2. Ammunition

Whether to be used in military or hunting, heavy metals used in ammunition directly effects environment. In this regard there are some researches about green ammunition production.[13] Green ammunition is being used especially with side arms and grenades. The Joint Center of Excellence for Guns and Ammunitions in USA has a green ammunition program going on.[14] In California, hunters will only be able to use lead free ammunition after July 1st, 2019.[15]

Every year thousands of people kill or harm each other with guns or ammunition. Imagining the source of this violence as "environment friendly" may seem like a Tom & Jerry cartoon. Harming people with green ammunition can't be an excuse from judgement. But not all ammunition is spent in operations, a great amount is spent in exercises. We cannot imagine how harmful our life fire exercises are to the living beings in the seas. Since it's assessed that this world will be our home for some time, there can be some arrangements in this area, to leave a healthier world to whomever will be standing to live it.

Demining actions have been in the spotlights for decades, and landmines do pose a mortal threat to countless people, but at the same time the issue of unexploded ordnance is also very serious. In a 2002 analysis on the data related to the Injuries and deaths caused by unexploded ordnance in Afghanistan [16] found that unexploded ordnance caused even more injuries than landmines. The report also found that recent conflicts, characterized by high altitude intensive bombing are a big source of unexploded ordnance, especially when targeting munition depots or through the use of cluster bombs.

There are solutions to this issue, ranging from educating the population and especially children, to making unexploded ordnance's design less attractive to children, increasing the R&D funding equipment like robots used to clear up unexploded ordnance, and up to encouraging debate on the responsibility of the governments to enhance their efforts on getting rid of disposal ordnance.

Of course, unexploded ordnance does not pose a problem only in areas plagued by military conflicts, it appears in all countries after close-up of military bases and firing ranges. In a Rand study [17], the costs involved in cleaning the unexploded ordnance vary depending the methodology and the intensity of the clean-up, but the most expensive approach, based on excavating the contaminated soil down to four feet and moving the soil, in order to make the land available for residential use, cost 1,1 billion USD to be implemented in only one site of 7.000 acres used as a multipurpose training range. The least costly alternative, favored of course by the military, involved just surveying the surface with metal detectors and digging to remove the metal detected (with the risk of not detecting some unexploded ordnance) involved expenses of 35 million USD.

4. Other environmental implications of the military activity

The military activity, either during peacetime or wartime, produces obvious negative effects on the environment, but the debate on the extent of these effects has not been at the same level as the debate regarding other areas of activity, such as industrial production. One reason is that the defense area has a special place in the attention of governments, and is not actually seen as an industry; as a result the negative externalities it may produce are usually ignored in the name of national security. Also, it benefits from the cloak of secrecy, in the name of the same national security, more than other government or private areas of activity, which leads to less transparency and accountability.

As an example, the military activity has environmental implications even beyond the obvious pollution discussed above. It may get in the way of increasing the use of cleaner energy, as it was the case in France, where a project of installing wind turbines that

would have generated 3.000 megawatts (1/3 of the existing wind turbines park in France, that generated 9.000 megawatts in total) as blocked by the military, on the grounds that the project had security implications as it interfered with the radars detection capabilities, considering the increase in size of the wind turbines in the last years, from 90 m up to 200 m in height [18]. The wind energy, even if it is beneficial for the environment, poses defense and security problems also to the military planes that need to train at lower altitudes. In this respect, France faces a difficult dilemma: increase the share of green energy produced by wind turbines or favor the security considerations, if we are to analyze the military demands of having 60% of the France's territory restricted in the future for wind turbines, as compared to the 15% in present.[19]

3. Conclusion

Logistics is art of calculation. In every sum, we must add the environmental outcome, the effect of which can be seen only years later. Calculating states will find out the amounts spent on environment friendly solutions will bring profit in wellbeing. Worlds militaries have hundreds of ships, thousands of planes and tens of thousands tanks etc. All these vehicles using fossil fuel and letting out carbon wastes. Using environment friendly fuel is as important as appropriate logistic calculations(like bringing together the goods and using a bigger transportation unit).

Military does exercises. That's the nature of the concept. And during these exercises thousands of rounds of ammunition is being spent, all of the waste ending up either on soil or in the ocean. Exercises will always be performed by military, but environment friendly planning should be considered all time. At least using environmental friendly charges will help the effort of leaving a better world behind.

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