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For Soldiers' Comfort

A slew of companies is trying to make life easier for soldiers living in harsh terrains

***FUTURE TECH** MKU stand at Aero India*

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COMBAT FORCES ARE OFTEN required to operate in diverse environmental conditions over long periods of time. This can have an adverse effect on their alertness, and can be disconcerting for the troops and their well-being. Thus, it becomes imperative to provide proper nutrition, right clothing material and hi-tech equipment to the troops to combat severe weather conditions. Various companies are developing clothes, food and equipment to make life better for such soldiers.

Personnel Clothing

New Generation soldier clothing is designed keeping in mind comfort, mobility and camouflage. Lighter, more breathable fabrics which retain less moisture or prevent it from contacting the skin can greatly enhance comfort and mobility. Equally important are abrasion resistant fabric. The Multicam camouflage pattern, which was first used by the US MultiCam and its inspired designs aim to blend with a variety of surroundings such as deserts, urban areas and jungles. This was adopted after failed experiments with pixelated designs.

Previously, fire resistant uniforms were provided to air and vehicle crew but recent experiences with improvised explosive devices (IEDs) have shown that incorporating it with the infantry can prove beneficial too. The combat shirt increasingly used by NATO armies uses fire-resistant, lightweight, breathable and moisture wicking fabrics intended to greatly increase comfort and mobility in hot and humid conditions. They have been used widely in Afghanistan and Iraq, and now improved variants based on feedback are being developed. They can be used in conjunction with plate carrier systems like the Improved Outer Tactical Vest (IOTV) and Osprey. The combat blouse, and pants are also made out of similar fabrics and come with integrated pads for the knees and

NATO armies have been using knee height water resistant socks to prevent the feet from getting soaked in moisture and thus creating discomfort and infections. This can be particularly useful in tropical areas and plains with water bodies.

Individual Soldier Load Carrying System

A soldier's individual load has been seen as one of the biggest concerns for commanders in recent years. A good individual load carrying system can provide the troops with better mobility and comfort for a given load vis-a-vis legacy systems. The US Army Modular Lightweight Load-carrying Equipment (MOLLE) has been at the forefront in this field and similar concepts are emerging in other armies as well. The Indian Army has also expressed interest to provide modular load carrying systems for its troops. Any modular load carrying system consists of the following items:

- Battle Load Carrier Vest with Pouch Attachment Ladder: This may be a stand-alone vest or a body armour/plate carrier vest with the Pouch Attachment Ladder System (PALS). The Ladders are of a fixed standard so that they can accommodate a variety of pouches supporting ammunition magazines, grenades and communication handsets.
- Main Pack with Internal Frame: The main rucksack comes with an aircraft grade aluminium frame to support the load. The straps ensure that the weight is distributed over the torso.
- Patrol Pack: This is the general purpose pack with a lower volume compared to that of the main pack.
- Hydration System: The hydration system allows instant hydration for the soldier's higher storage volume and easy carriage. It consists of a bladder which will be carried on the back of the soldier on a standalone basis or inside the backpacks. A tube is attached to the bladder leading to the shoulder close to the mouth.
- Multi Utility Pouches: These pouches allow the carriage of ammunition magazines, food and first-aid kits with easy drainage to prevent water clogging. These pouches can be mounted on the PALS present on the load carrying vest or the body

Combat Boots

Boots can vary according to operational conditions like hot deserts, extreme cold, hot and humid temperatures. The focus is on comfort, grip, traction and stability. Boots should also be specialised to provide heat insulation and water resistance to prevent frost-bites which is a major issue in colder climates. Noga-Einat, which supplies for the IDF, has tied up with an Indian company and set up a manufacturing unit to supply to the IDF and the Indian armed forces.

High Altitude Clothing

High Altitude Clothing present a set of different challenges as it must provide protection from temperatures as low as -50 degrees. The emerging approach is to have a layered solution tailored to different temperatures starting from undergarments, jackets, trousers to high insulation Parka and trousers. One such system in use with the US Army is the GEN III Extended Climate Warfighter Clothing System (ECWCS).

The Indian Army has been importing high altitude extreme low temperature clothing and is looking to manufacture them locally to minimise supply fluctuations.

Shelters

Conventional frame supported tents still find a use today due to their high availability, simplicity and low cost. The Indian Army is being supplied frame supported tents for tropic, desert and high-altitude conditions with continuous improvements made with respect to the fabrics and the frame material. Developments are taking place both abroad and in India to make rapid deployable and permanent shelters for demanding requirements of high altitude and extreme low temperatures.

The Deployable Rapid Assembly Shelter (DRASH) made by DHS Systems LLC is a portable shelter that can be set up within minutes of arriving on site with no special tools. It is compact (2 per cent of its deployed size) and easy to transport on a trailer which can be moved by logistic vehicles.

The shelters come in various sizes and functionality; specialised shelters are made for general accommodation, command posts and hospitals. The generators used in the shelter deployment can also be used to power various systems like computers, medical diagnostics, equipment, air conditioning

***FOOD ANYTIME** Packaged food by DRDO*

inside the shelter among other things. The command post has command and control computers and additional power generation system to support the electronics. The shelters were extensively used in Iraq and Afghanistan conflicts. Bharat Electronics Limited (BEL) has tied up with DHS Systems LLC to provide DRASH shelters to the Indian Army.

The Defence Institute of High Altitude Research (DIHAR), a DRDO laboratory based at Leh, has developed a shelter for troops that uses non-conventional energy for heating, instead of fossil fuel. It uses a greenhouse based thermal trap area over the roof and utilises greenhouse concept for creating a tunnelling effect to trap solar heat in the shelter, bringing it to higher temperatures and making it more comfortable for the inhabitants. Additional heating is made possible with power supplied by generators at times when temperatures are too low and not enough solar heat is available.

Food and Ration

The importance of food in an army can be gauged by French statesman Napoleon Bonaparte's quote – 'An Army marches on its stomach'. R&D around the world is developing foods which are portable, easy to store, rich in nutrition, long shelf life under harsh conditions and a good taste.

Defence Food Research Laboratory (DFRL), Mysore has been developing and producing products like the meal ready-to-eat (MRE), emergency/survival rations for the armed

through transfer of technology. It has developed food bars which contain wide range of nutrients as well as sufficient amount of proteins, fats, and carbohydrates. Soldiers at high altitude often suffer from a lack of appetite and therefore, it is critical to provide them appetisers which make it conducive to consume nutritious diet. DFRL has developed several hot water reconstitutable appetiser mixes without preservatives which have a shelf life of six months. It has also developed performance enhancement drinks, high shelf life chapattis, preservation of food grains by microwave processing and anti-freeze containers for vegetables and fruits.

Testing Kits

Regularly testing soldiers, food and water for infections and other undesirable elements can be the difference between life and death, especially in areas where medical care is not readily or sufficiently available. The Defence Research and Development Organisation (DRDO) has developed enterobacteriaceae Identification Kit, Meat Testing Kits, water testing kits and Iron Removal Units for troops.

First Aid Kits

First aid kits usually contain gloves, hemostat Gauze, trauma dressing, surgical tape, nasopharyngeal airway tubes contained in compact packs. Bengaluru-based Axio Biosolutions has been leading the development and manufacturing of compact hemostat kits for soldiers. It has already supplied to the Indian Army, paramil-