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FRIEND AND FOE TRACKING IN MILITARY UNIFORM

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ABSTRACT

Military uniforms are designed to show that the wearer is a member of a country's armed forces. Depending on the army and military branch, they might vary. The military uniform is a style of dress with distinct symbolism, a long history, and a rich tradition. Armed forces personnel can be distinguished from the general population by their military uniform. While maintaining military uniforms for security reasons, there is also a risk of enemy infiltration into our forces. If a conflict occurs, military soldiers want to swap places with people wearing the same dress code, including secret agents, and they need to be aware of certain tactics. This paper reviews about techniques adopted in the uniforms for easy tracking of Friend or foe.

Keywords: Friend or Foe, military uniform, RFID, IFF

INTRODUCTION

A military uniform is a standardised outfit worn by one country's paramilitaries and members of the armed forces. Without secured clothing, there may be accumulation of fake people joining people in military units. To protect country from such incidents, it is necessary to build a military uniform with tracking of friend or foe inside any military droop. Accurate reporting, visibility ,capabilities, and correct people and asset identification are crucial for the military.

Indian soldiers are being killed by friendly fire in regions where they are fighting militants in counter-terror operations. The Indian Army, which has been engaged in counter-terrorism operations for the last 25 years, is fighting militants literally in the dark lacking the ability to recognise ‘friend or foe’. A BSF constable was shot by jawans of Rashtriya Rifles, who mistook him for a terrorist attacking their camp. In another incident, troops from of Rashtriya Rifles and an elite Special Force unit came face to face unfortunately. As the new breed of militants is donning Army uniforms, it is difficult for both villagers

and Army personnel to distinguish between them and genuine soldiers. Earlier, terrorists wore civilian clothes to blend with the population in Kashmir.

Recognising the need to prevent such incidents, the Army proposes to develop smart vests to soldiers to prevent friendly fire casualties, with built-in codes and GPS to auto-identify its troops, who often encounter each other in hostile situations. To overcome this fratricide, different technologies are under research and being used by different countries.

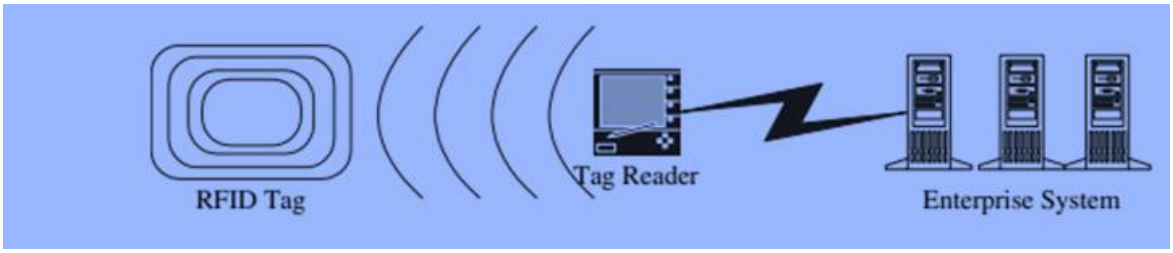
These are the following techniques which are currently used:

1.RFID technology

RFID technology is used in friend and foe tracking systems in military uniforms,

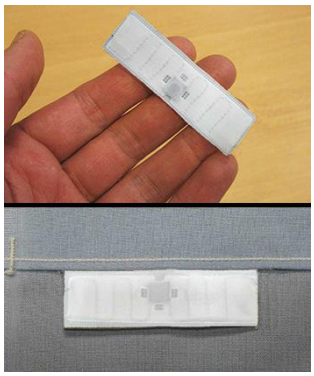
RFID (Radio-frequency identification) technology is a wireless system that comprises of a button tag and a reader. The RFID reader has antennas that produce radio waves, and the signal was picked up by the button tag. This type of method aids the idea in detecting wrong people in the military group.

RFID is a growing area of automatic identification that provide details on a more detailed description of electromagnetic proximity identification and data transaction systems. RFID represents an improvement over bar codes in terms of non-optical proximity communication, information density, and two-way communication ability by using "RFID tags" on objects or assets and "readers" to gather the tag information. Tags and readers interact with objects (assets) and database systems to provide an information and/or operational function in operational RFID systems. RFID technology is used for a wide range of applications, including supply chain tracking, toll collection, vehicle parking access control, retail stock management, ski lift access, tracking library books, theft prevention, vehicle immobiliser systems, and railway rolling stock identification and movement tracking.



They can be put inside a box, crate, or container because they can be read remotely and do not need line of sight to function.

In order to facilitate the process of tracing and monitoring items throughout the sewing process, a radiofrequency application has been put in the garment sewing line. The quickest approach to attach an RFID tag is by sewing it directly to the material; utilising a bag or a heat sealer requires more time. Hence same technique could be easily used in the military uniforms.



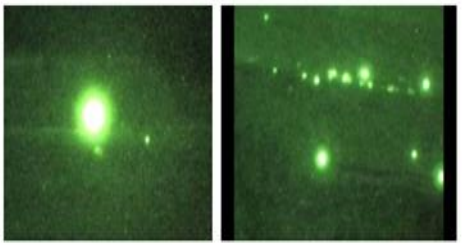
The majority of RFID laundry tags can be heat sealed to fabric. An RFID tag can be inserted into a tiny pocket of fabric if an item has additional fabric or numerous layers. After that, the fabric is stitched together to conceal the tag. Another way to use the pouch attachment technique is to tuck an RFID laundry tag inside the hem of a garment.

Centrex Technologies installed the Linen web® Pro system for full RFID Uniform Management with special customization to ensure continuity of service under stressful, intermittent conditions and with significant focus on system and data security. This system provides detailed tracking and management of uniforms and personal items for the troops.

2.Individual identify friend-or-foe (IIFF)

IIFF devices based on polymer emitters on flexible substrates were successfully evaluated to determine activation and observation range, performance under extreme environmental conditions, and emitter intensity decay as a function of multiple activations and time. It is found that observation at distances exceeding 700 metres and device functionality in temperatures ranging from -40 0 C to 71 0 C was recorded. In its current G3 version (IIFF), the device is simple to use and practical for military operational applications. This is due to the G3 model's use of a 1.5 V replaceable AAA battery and an on/off switch. Furthermore, the G3 version is not a burden to carry because it weighs only 79 grams.

The purpose of this is to design, build, and test a triggered infrared vehicular mounted identify friend-or-foe (VMIFF) device for use on military tactical vehicles in order to prevent low-altitude, air-to-ground fratricide from airborne platforms. The two generations of the VMIFF are developed with excellent design schematics which can cover maximum range observability and light emitting diode (LED) spectral emission.



3.Automated Biometric Identification System

The FBI's integrated automated fingerprint identification system (IAFIS), an electronic, searchable database containing the fingerprints of approximately 48 million people arrested in the United States, can be compared with data gathered by forces from ‘red force' personnel - detainees, internees, enemy prisoners of war, and foreign persons of interest as national security threats. Databases from other US government agencies will eventually be linked so that red force biometric data can be examined against numerous databases for probable matches. The DoD ABIS will be expanded to process and store biometric data such as facial recognition. Positively identifying terrorists and potential national security threats is crucial to the global fight against terrorism. Biometric technology enables the requirements of force protection, actionable intelligence, and law enforcement to be met. Proper application of these technologies will allow the military to distinguish between friend and foe, making the countries and their allies safer.

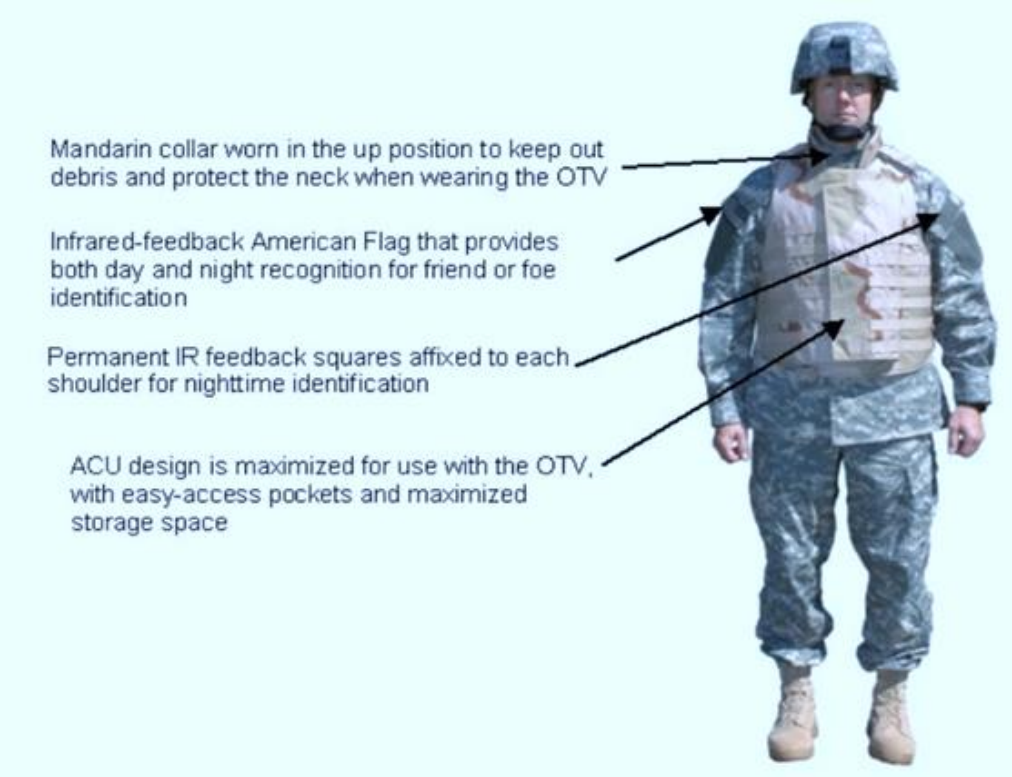
4.Nano Technology

Nanotechnology (NT) is the study of manipulating matter on atomic and molecular scale and NT enabled military technologies will ensure high speed and high-capacity systems for command, control, communication, surveillance; automation and robotics for minimizing exposure war fighters, first responders; superior platforms, weapons with miniaturisation. They come up with product with the use of nanotechnology with the metals, tags, sensors, etc. The military use of nanotechnology should lead to higher protection, more lethality, longer endurance, and better self-supporting capacities of future soldiers. Nanotechnology could greatly improve some of the existing technologies that will be fitted on military platforms and thus create new operational opportunities or, at least, help the engineers to deal with some shortcomings.

Nanotechnology alloy-based war tags with RFID and nano sensors can replace the conventional metallic plate identification. Garments and shoes can be designed around ultra-high frequency RFID tags for access control and positioning. Use of nanocomposites, nanofibers and CNTs will bring down the weight of the equipment carried by the soldier. Miniaturization of sensors, power sources and communication equipment will help him in sustaining long-drawn operations and, at the same time, health monitoring systems, remote bio-informatics and situational awareness will leverage his fighting capabilities.

5.Infra-red Detection

The Army combat uniform (ACU) will replace both versions of the battle-dress uniform and the desert camouflage uniform. The ACU is normally worn with a black beret or a patrol cap in the appropriate camouflage pattern, a moisture-wicking T-shirt, belt, and Army combat boots. The ACU enhances Soldier performance by providing a functional and ergonomic uniform that can be tailored to the mission. One of the special features is integration of Friend or Foe Identification Square on both left and right shoulder pocket flap.



The near-infrared reflective material can be sewn directly into the military's Army Combat Uniforms (ACU) to provide its soldiers with the tools they need to minimize "friendly fire." The material being supplied by TVI includes an American flag emblem that is an infrared feedback signal and separate infrared squares sewn into the shoulders of the uniform to identify troops at night. These elements reflect infrared signals to communicate with equipment carried by friendly forces.

6.Radar Identification of friend or foe (IFF) System

Identification, friend or foe (IFF) is an identification system designed for command and control. It enables military and national (civilian-located ATC) interrogation systems to identify aircraft, vehicles or forces as friendly and to determine their bearing and range from the interrogator. IFF may be used by both military and civilian aircraft .IFF was first developed during the world war II . It has received the radar frequencies on 125 MHz and 550-580 MHz .To start the identification procedure, the ground operator switched the pulse frequency of radar from 3,750 Hz to 5,000 Hz. The major military benefits of IFF include preventing "friendly fire" and being able to positively identify friendly forces.

7.IFF Glow patch

The IFF glow patch is the soldier's best friend on a dark battlefield. The patch attaches to combat fatigues and a Night Vision illuminator creates a glow. Therefore, units know where their "friendly" is positioned. As a result, the IFF glow patch protects the soldier against a mistaken identity. An IFF patch is built in different sizes, shapes, colours, and designs. The critical concern is not so much the design but that soldiers do not engage in battle without one.

8.Fibre optic cloth

Fibre-optic cloth was developed by Lumitex Inc which could be used to develop a more accurate system of identification. The product TRON is comprised of thin and flexible fibre-optic-woven cloth cut to military specifications. The sheets of the fibre-optic cloth are laminated into layers and can be formed into lighting devices of multiple shapes and sizes. The woven nature of the cloth emits light in a controlled way creating a uniform light-emitting surface. The system can be worn under the clothes, on outer tactical vests, on an arm or mounted to a helmet.

9. Integrated Visual Augmentation System

Avoiding fratricide is still a challenge for U.S. ground forces, despite advances in technology ranging from small, wearable infrared beacons to sophisticated tactical smartphone-based systems that allow leaders to

track the location of friendly units. Recent soldier surveys show a need for an enhanced Individual Friend or Foe (IFF) capability for dismounted soldiers that can be incorporated into uniforms and individual equipment and identified at extended ranges. Advanced target recognition technology in the new Integrated Visual Augmentation System (IVAS) will help close-combat soldiers identify enemy targets from non-combatants on the battlefield.

The Integrated Visual Augmentation System (IVAS) is a head gear based on augmented-reality that overlays digital elements like maps or video displayed on top of the real world in front of the army personnel.

These goggles are designed to display location data, 3D, and thermal images, and allow warriors to see through smoke. The wearer may check their position with a compass and find members of the squad using

an almost miniaturised blue force tracker. These combat goggles are designed to upgrade situation awareness and the way the soldiers fight in the battle fields.

The new technology has been developed to provide soldiers with the information they will need to figure out what is next, whether this is the right course of action, and to display network information in a way that does not overwhelm the soldier but instead tells him where he needs to go, where his buddies are, and where the enemy is. The whole system is developed in a soldier centred design.

CONCLUSION

Overall, the decision to use friend and foe tracking technology in military uniforms should be based on a careful analysis of the potential benefits and risks, as well as the specific needs of the military unit . While this technology can be a valuable tool in certain situations, it should be used in conjunction with other tactics and strategies to ensure the safety and success of military operations.

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