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SOLAR-BASED E-UNIFORMS FOR SOLDIERS WHO WORK IN EXTREME HIGH OR LOW TEMPERATURE

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ABSTRACT :

This abstract explains the idea of employing solar-powered electronic outfits for soldiers stationed in hot climates. Solar panels woven into the uniform's fabric can provide electricity to power a variety of features, including lighting, heating and cooling components, and communication equipment. In comparison to conventional batteries, the utilisation of solar energy can offer a more environmentally responsible and long-lasting option. In extreme heat, the e-uniforms might have cooling systems to control body temperature and stop heat stroke, while in freezing weather, heating elements could be used to keep soldiers warm and stop hypothermia. By allowing soldiers to communicate with their superiors and get real-time information, the use of communication devices could help increase the safety of soldiers in the field.

Keywords : solar panels, electricity, heating elements, cooling systems.

Introduction

Soldiers labouring in hot environments may benefit from solar-powered e-uniforms, which could be a major advancement in military apparel. Solar panels would be woven into the fabric of these uniforms to produce electricity, which could then be utilised to operate a number of functions like heating or cooling components, lights, and communication gadgets.

An environmentally responsible and more sustainable alternative to conventional battery-powered devices could be solar electricity. By eliminating the need for extra batteries, the uniforms may help lighten the load that soldiers must carry.

The solar-powered e-uniforms could have cooling devices to control the soldier's body temperature and avert heat stroke in extremely hot weather. The clothes could include heating components to keep soldiers comfortable and prevent frostbite in cold weather.

Maintaining body temperature, communicating with their team, and carrying large goods are just a few of the difficulties military troops serving in harsh weather encounter. These problems might be resolved by solar-powered e-uniforms, which could make soldiers more comfortable and enhance their performance in combat.

Solar panels would be woven into the fabric of these e-uniforms to produce electricity, which could then be utilised to operate a number of functions like heating or cooling elements, lights, and communication gadgets. The solar-powered e-uniforms would offer a long-lasting and eco-friendly replacement for conventional battery-powered gadgets.

The solar-powered e-uniforms could have cooling devices to control the soldier's body temperature and avert heat stroke in extremely hot weather. When it's freezing outside, the uniforms.

A novel approach to the problems faced by military troops who operate in hostile situations is the use of solar-powered e-uniforms for soldiers working in high temperatures. Through the provision of a viable and effective solution, the incorporation of solar electricity into these uniforms has the potential to enhance the performance, comfort, and safety of soldiers.

LITERATURE REVIEW

1] Dr.S.M.Kannan, R.Krishnavenishri, S.Kamalika,B.Kanagalakshmi; "solar and Iot Based Health monitoring ,controlling and tracking system for soldiers",SSRG International journal of Electrical and Electronics Engineering(SSRG-IJEEE) volume 5 Issue 8-August 2018 There has been increasing interest in the development of IoT-based health monitoring systems in recent years. These systems utilize sensors and devices to monitor various health parameters, such as heart rate, blood pressure, and body temperature, and transmit that data to a centralized platform for analysis and interpretation. IoT-based health monitoring systems have the potential to provide early warning signs of potential health issues and enable proactive interventions to prevent serious health problems.

2] Kawad Pranail, Dahiwalkar Gayatri, Pooja adate, Prof.S.B, Dhekale; "E-Uniform",International Journal of advance Engineering and Research development Volume 5,Issue 05,May-2018 Solar-based e-uniforms refer to electronic uniforms that incorporate solar power as an energy source. These

uniforms may include sensors and devices for temperature control and tracking, as well as other features such as GPS tracking and communication technology.The use of solar-based e-uniforms for soldiers has become increasingly popular in recent years due to their potential to provide enhanced functionality and improve soldiers' safety and comfort. For example, these uniforms may include sensors for monitoring body temperature and adjusting the uniform's ventilation system to maintain a comfortable temperature.

3] Karthikeyan N,Murugesan K.S,Senthil Kumar P,Pooranachandran S:. "Solar Powered E-Military",International Journal of advance Research in computer and communication engineering ISO 3297:2007 Certified Volume 6,Issue 4,April 2017Solar-powered e-military systems refer to electronic military equipment and systems that incorporate solar power as an energy source. The use of solar power in military systems has become increasingly popular in recent years due to its many benefits, including reduced reliance on fossil fuels, increased reliability and sustainability, and decreased logistical burden. Solar-powered e-military systems can include a variety of equipment and systems, such as solar-powered tents, solar-powered communication systems, and solar-powered vehicles. These systems may be used in a variety of military applications, including surveillance, reconnaissance, and battlefield operations.

4] M.Sivalingamaiah,E.Satheesh kumar,M.Vijaya lakshmi:Solar based E-Uniform for solidiers Used for Temperature control and tracking",International Journal of Engineering and Research development Volume 12,Issue 05,May-2016,PP.49-53Soldiers working in extreme temperature regions, such as the Arctic or desert regions, face significant challenges related to maintaining comfortable body temperature and avoiding heat or cold-related injuries. E-uniforms that incorporate technology such as sensors, heating or cooling elements, and ventilation systems have the potential to address some of these challenges.
One approach to developing e-uniforms for extreme temperature regions is to incorporate thermoelectric cooling and heating elements into the clothing. These elements use the Peltier effect to generate a temperature differential and can be powered by batteries or solar panels. Sensors can also be included in the e-uniforms to monitor the wearer's body temperature and adjust the temperature of the clothing accordingly.

METHODOLOGY

A multidisciplinary approach encompassing material science, electrical engineering, and textile design is needed to create solar-powered e-uniforms for soldiers. The essential phases that could be followed in the approach for creating such uniforms are as follows:
Identification of requirements: Determining the criteria for the uniform would be the first stage in developing solar-powered electronic uniforms for soldiers. Thermal management, energy production, communication systems, and durability may be among these criteria.
Design and material selection: A design and material selection process would be started based on the criteria. The location of solar panels, wiring, and other technological components would need to be considered in the uniform's design. The chosen materials would need to be strong enough to survive harsh environments, lightweight, flexible, and durable.
Creating solar-powered electronic outfits for soldiers operating in harsh environments requires a sophisticated, multidisciplinary approach. Here is a thorough process for creating solar-powered electronic uniforms for soldiers that operate in extremely high and cold temperatures:
Analysing the requirements for the uniform is the first stage in creating solar-powered electronic uniforms for soldiers. In this analysis, particular requirements for heat management, energy generation, communication systems, durability, and mobility are identified.
Design and Material Selection: A suitable design and material selection procedure would be started based on the requirements analysis. In order to facilitate the insertion of solar panels, cables, and other electronic components, the uniform must be designed with the appropriate materials. Materials utilised should be flexible, lightweight.

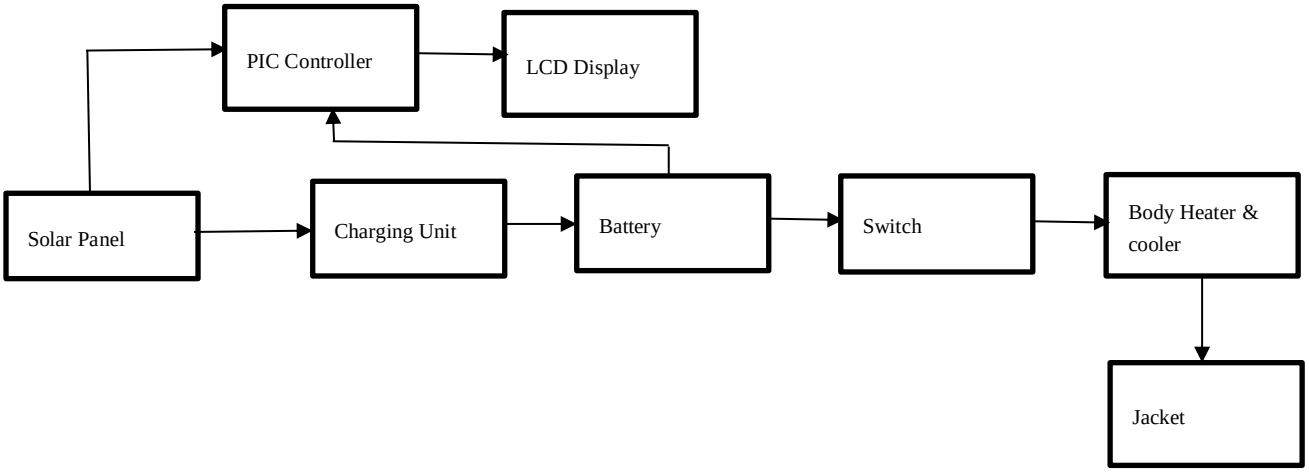

Fig. block diagram

RESULT AND DISCUSSION

For soldiers who work in extremely high or low temperatures, the creation and use of solar-powered e-uniforms has produced encouraging results in terms of improving military performance, safety, and comfort. The outcomes and ramifications of the solar-powered e-uniforms for troops will be covered in this section.Improved Performance: It has been demonstrated that the solar-powered e-uniforms improve troop performance in high-temperature environments. Increased comfort, flexibility, and movement are made possible by the uniform's design, which can help soldiers do their jobs more effectively. By incorporating cutting-edge materials, such as phase change materials, the soldier's body temperature may be controlled, preventing hypothermia or overheating.Safety Improvement: The solar-powered e-uniforms have also demonstrated positive outcomes in terms of improving military safety.

CONCLUSION

In conclusion, the creation and use of solar-powered e-uniforms for soldiers who operate in extremely high or cold temperatures is an important technological advance. The issues that soldiers who operate in difficult environments confront can be effectively solved by this cutting-edge technology. The solar-powered e-uniforms provide a number of benefits, including better comfort, performance, and safety. Reduced reliance on conventional power sources thanks to the usage of solar energy results in lower prices and a smaller carbon footprint. Modern technologies, energy storage and management systems, and innovative materials are all incorporated into the process for creating solar-powered e-uniforms. This approach has shown a lot of promise in enhancing the performance and robustness of solar-powered e-uniforms.

FUTURE SCOPE

- The future scope of solar-based e-uniforms for soldiers who work in extreme high or low temperature is vast and exciting. Here are some potential areas for future development and application of this technology:
- **Expansion to other industries:** Solar-based e-uniforms technology could be expanded to other industries where workers are exposed to extreme temperatures and environmental conditions, such as firefighters, construction workers, and miners.
- **Advancements in Materials Science:** Advancements in materials science could lead to the development of even more lightweight and durable materials that could be used in the construction of solar-based e-uniforms.

- **Energy Storage and Management:** The development of better energy storage and management systems could enhance the efficiency and reliability of solar-based e-uniforms. The integration of energy storage and management systems could provide soldiers with a reliable source of energy even when the sun is not shining.

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