

Smart Armor and Wearable Technologies: Enhancing Soldier Safety in Modern Warfare.

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Abstract: *Warfare in the modern day is becoming increasingly more reliant on sophisticated defensive and situational technologies in order to provide greater security, survivability, and effectiveness of the soldier. This review focuses on the latest trends associated with smart armor and wearable technologies which combine high-tech materials, embedded sensors, connectivity to the Internet of Things, and analytics driven by artificial intelligence. Lightweight nanocomposite ballistic armor, shear-thickening fluids, graphene-based protection, physiological monitoring wearables, augmented reality (AR) combat displays, and powered exoskeletons are among the key innovations that were identified to be highlighted in the analysis. All these technologies enhance real time threat detection, health surveillance, communication and mobility in the battlefield. The research results suggest that smart armor would help increase the level of protection at the same time and decreases the weight of the armour and wearable sensors assist early recognition of injuries, fatigue and hazards in the environment, which will further lead to better decision making and mission results. Nevertheless, the problem of cybersecurity vulnerability, short battery life, interoperability and field durability continue to pose a challenge to large-scale use. The conclusion of the review is that smart armor and wearables are a necessary paradigm change to complete networked, data-centric soldier systems and that more research is necessary in secure communication protocols, novel materials, energy-efficient designs, and validation on the field scale. The paper gives a comprehensive insight into the modern trends, constraints, and future directions that need to be taken into consideration to create next-generation protective technologies to modern soldiers.*

Keywords: *situational technologies*

