

Human Factors Interventions for Risk and Reliability Management of Defence Systems

Authors : Chitra Rajagopal, Indra Deo Kumar, Ila Chauhan, Ruchi Joshi, Binoy Bhargavan

Abstract : Reliability and safety are essential for the success of mission-critical and safety-critical defense systems. Humans are part of the entire life cycle of defense systems development and deployment. The majority of industrial accidents or disasters are attributed to human errors. Therefore, considerations of human performance and human reliability are critical in all complex systems, including defense systems. Defense systems are operating from the ground, naval and aerial platforms in diverse conditions impose unique physical and psychological challenges to the human operators. Some of the safety and mission-critical defense systems with human-machine interactions are fighter planes, submarines, warships, combat vehicles, aerial and naval platforms based missiles, etc. Human roles and responsibilities are also going through a transition due to the infusion of artificial intelligence and cyber technologies. Human operators, not accustomed to such challenges, are more likely to commit errors, which may lead to accidents or loss events. In such a scenario, it is imperative to understand the human factors in defense systems for better systems performance, safety, and cost-effectiveness. A case study using Task Analysis (TA) based methodology for assessment and reduction of human errors in the Air and Missile Defense System in the context of emerging technologies were presented. Action-oriented task analysis techniques such as Hierarchical Task Analysis (HTA) and Operator Action Event Tree (OAET) along with Critical Action and Decision Event Tree (CADET) for cognitive task analysis was used. Human factors assessment based on the task analysis helps in realizing safe and reliable defense systems. These techniques helped in the identification of human errors during different phases of Air and Missile Defence operations, leading to meet the requirement of a safe, reliable and cost-effective mission.

Keywords : defence systems, reliability, risk, safety

Conference Title : ICAEHF 2020 : International Conference on Applied Ergonomics and Human Factors

Conference Location : Rome, Italy

Conference Dates : January 16-17, 2020