Tier 2 Priority: Medical Countermeasure Products – Operating in CBRN Environments STaR Shot Problem Statements.

Medical countermeasures are a priority theme of the Next Generation Technologies Fund (NGTF). In this call for proposals from Australian Small or Medium Size Enterprises (SME), the NGTF is seeking concept demonstrators, technology demonstrators and game-changing innovations that increase a warfighter’s awareness and understanding of the chemical and biological agents they may be exposed to when operating in Chemical, Biological, Radiological and Nuclear (CBRN) threat environments. While all proposals that promise to enhance the warfighter’s CBRN threat awareness will be considered, there is particular interest in receiving proposals that address the following challenges.

1. Human-operator functional state monitoring that is holistic, i.e. integrated from sensor network through analytics to user interfaces, and realistic, i.e. fit for a well-defined mission profile. Proposals that are well-grounded in human science and medical research are preferred. They would clearly identify the target/criterion for monitoring (alertness, stress, attentional focus, spare capacity, etc); employ validated and robust signal processing and inference algorithms leading to end-user-relevant decision points; and make an informed choice of which sensors and data to use based on estimates of relative utility. Ideally, functional elements of extant warfighter equipment are utilised or repurposed.
2. Data analytics for human health and functional state monitoring that is able to issue alerts to the individual warfighter based on the individual’s cognitive, physiological and/or physical performance thresholds and health indicators. Such personalised thresholds will need to be derived from the data collected through a network of wearable and environmental monitoring and sensor devices.
3. Near real-time detection and identification of biological agents. Detection and identification can be through direct measurement of microbes or derived indirectly, e.g. through the monitoring of biomarkers in a population or through other diagnostics tools. Whatever detection and identification method is proposed, estimates of its effectiveness, its accuracy and time of detection and identification will need to be provided as part of the proposal.