DEFENCE INNOVATION NETWORK

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Defence Innovation Network Grant Scheme: Pilot Project

How can ADF measure real-time and cumulative effects of stress and present that data in order to enable detection and intervention of high risk individuals

- The ADF currently faces challenges with recruiting and retaining personnel across the Army, Air Force and Navy, resulting in the ADF being understrength. A core issue underpinning these challenges are the perceived, and actual, hardships Defence personnel must face.

- As noted in the recent *Mental Health Prevalence Report,* service in the ADF has an impact on the mental and physical health of personnel. An estimated 46% of transitioned ADF members within the past five years met 12-month diagnostic criteria for a mental disorder.

- One of the direct causes of mental illness / injury from ADF service is prolonged exposure to stress, which not only damages brain cells but could lead to irreversible chronic stress. In the U.S., 42% of active duty soldiers report an intent to leave the Army profession due to stress, and a further 23% of soldiers admit they work less proficiently as a result of stress.

- Personnel who experience prolonged periods of stress may experience diminished role capacity, suffer from negative health outcomes, develop depression, anxiety and panic disorders, have reduced cognitive performance and experience suicidal ideation &/or suicide.

- ADF personnel would benefit from proactive strategies that aim to lessen the burden of service related stress, whilst Command and Training staff would benefit from being better informed about the capabilities of their troops, including the impact of stress on personnel.

- Soldier.ly believe that the solution to the problem statement '*How can ADF measure real-time and cumulative effects of stress and present that data in order to enable detection and intervention of high risk individuals'* is to utilise smart wearable devices.

- In recent months, Soldier.ly has conducted research to understand the role that wearables with biometric and physiological sensors can play in managing stress. Biofeedback has been used by individuals and in therapeutic sessions for many years, and the current generation of wearable devices and biometric sensors could potentially measure human physiology, such as cardiac activity and skin conductance parameters, together with other biometrics in order to provide the ADF with the means to monitor stress and improve personnel health and performance &/or retention by detecting and intervening in personnel stress.

- Ultimately, the proposed project aims to research, validate and deliver a prototype, with high prediction, for a smart non-invasive wearable device for the ADF. Within a 10-12 month timeframe, the project aims to deliver a world-first, user-friendly device that monitors and responds to physiological and behavioural biometric data to alert ADF personnel and training/support staff about ongoing stress levels when prolonged symptoms of stress occur.

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- This project aligns with the Fifth National Mental Health and Suicide Prevention Plan (2017-2022), and is an investment in the mental and physical wellbeing of all ADF personnel. It provides the ADF with a means to enable its leaders to support the health of their personnel, and enables ADF personnel to take every opportunity to look after their own mental health.
- This project will provide the ADF with unique insight into the causes and impact of service related stress, whilst providing Joint Health Command with data on the 'health' of the ADF so that management strategies can be implemented.
- The aim is to deliver medical grade data using human physiology and demographics for analysis and would adhere to the following international standards: IEC 62304 – Medical device software – software life cycle processes, and IEC 60601 – Safety and effectiveness of medical electrical equipment.
- Privacy and data security are integral components of this project; the Soldier.ly team are committed to ensuring all project data is encrypted, anonymised and securely stored.
- **This project will have a direct impact on improving the lives of ADF personnel**