

# **FORCE PROTECTION AND MEDICAL**

**2020**

## **360 Degree Vision Enhancement Wearable System for Soldiers in Battle Zones**

To minimize damage and improve the effectiveness of our soldiers in an adversarial environment, the proposed technology will allow the soldiers to have 360-degree vision even at night and eavesdrop on locals using the real-time translation of local language discreetly. The user will be in constant contact with his peers and the Command Center electronically for improved safety. Originally, the system was developed for Blinds and Persons with Visual Impairment. Now it is proposed to extend it to the battle zone.

## **Universal Thermal Dressings Improve; Force Readiness, Resilience, and Saves**

911Medical Devices (911MD) has patented on-demand thermal dressings to fill major capability gaps in acute trauma care to protect the Warfighter and improve U.S. Armed Forces greatest threat, which is injury. ODTD are field dressings with a thermal component to rapidly, safely treat a variety of primary traumas (musculoskeletal, hemorrhage, burns) and secondary injuries (infection, cerebral hypoxia), at the point of acute trauma. We combined Johnson & Johnson's first commercial product, sterile dressings and reinvention of the 65-year-old instant cold pack to produce 911MD first and novel thermal dressing for a wide array of traumas.

## **OCS" (Operator Communication System)**

OCS is covertly and conveniently designed to look like a wedding band type ring. Its purpose is to serve as an intuitive smartphone/SATCOM interface and information gathering device especially when paired with our in-ear device which is similar to a hearing aid in appearance. OCS is a covert system which allows silent communication, positive user identification, and continual automatic gathering of user information, including health, wellness, mission readiness, and real-time mission activity. Intuitively controlled & little instruction needed, OCS also enables the soldier to command their cell/satellite combination phone at distance, permitting communication from a defensible position which may not support service due to overhead structure. Support personnel will be able to update Warriors with real time intel while knowing exactly the Warrior's Health & wellness status anywhere in the world. To our knowledge, OCS can replace today's mission communication system (Integrated Tactical Network-ITN) at a fraction of the cost, weight, and power requirements.

## **Eye Drops Simplified: Improving Outcomes, Improving Safety**

Dropless Dropaids has developed a versatile applicator that enables the warfighters to effectively instill eye drops seamlessly, on-the-go regardless of body position, manual dexterity, or visual acuity. Dropaids are patented and precise, applying eye drops independent of gravity, away from line of sight, while improving and reducing waste. Because they are disposable, they reduce the risk of inadvertent eye dropper contamination which could lead to viral outbreaks and hamper unit readiness. Durable and compact, portability is not a concern as these featherweight, pocket-sized flat-packs can fit anywhere, making them mission-ready for every setting from clinical to rapid deployment situations.

### **Concussion Mitigation Helmet Liner System**

The Concussion Mitigation Helmet Liner System increases the effectiveness of existing helmets and gives the “Warfighter” a much better chance of survival from Concussion level impacts and Traumatic Brain Injury. The electronic liner system has an embedded microprocessor which monitors physical conditions and determines if a concussion event has taken place. The Active Mitigation System is patented, lightweight, expandable and works to prevent serious injury. This makes it possible to keep a Warfighter in the battlefield longer and reduces the need for Medical treatment.

### **The ATS Device**

The ATS Device trains Spatial Disorientation brought on by Degraded Visual Environments, in-aircraft, to effectively train pilots to deal with the visual and vestibular illusions encountered in flight. Current methods fail to produce both visual and vestibular (inner ear) illusions leading to inadequate training. Simulators lack the ability to induce vestibular illusions which are critical to effective training of Spatial Disorientation.

### **IRIS-L: An Intelligent Retinal Imaging System for Laser Eye Injury**

Laser-induced ocular injuries are becoming more common on the modern battlefield. IRIS-L is a handheld medical decision support tool that assesses these injuries. The system uses artificial intelligence to detect if retinal damage has occurred, determine if that damage was caused by a directed energy device, and predict the long-term effects to the patient. The diagnostic exam is battery powered, works offline, and can be administered by any combat medic, allowing service personnel to be diagnosed and treated closer to the point of injury.

### **Universal Self-Retaining Surgical Retractor System**

Bleeding is responsible for over 90% of preventable deaths on the battlefield, and over 7,000 damage control surgical procedures to control bleeding in the abdomen were performed during recent U.S. combat operations. To facilitate rapid bleeding control, surgeons use a variety of self-retaining metal retractors for improved exposure of bleeding sources, but unfortunately these retractors were designed for use in civilian operating rooms and the unique deployed environment severely restricts the retractor options available to military surgeons. This presents challenges when performing damage control surgery in austere settings, since suboptimal exposure places injured Warfighters at increased risk of death from delayed control of bleeding. Specifically designed for the deployed environment and providing increased speed and functionality compared to current retractor options, our dual-use and universally adaptable technology delivers a portable, non-table-fixed, self-retaining retractor system resulting in superior hands-free surgical visualization and exposure. By improving a military surgeon’s ability to quickly retract, expose, and control sources of bleeding, damage control surgical procedures in the deployed environment will result in improved Warfighter survival.

### **Rapid SARS-CoV-2 live virus testing for medical + environmental detection + in-vitro diagnostics**

CodeClear Ventures Inc., is creating the next generation of rapid diagnostic tests ideal for living safely in a world of infectious diseases, STDs, food borne illness and COVID-19. The company developed a platform of non-toxic color-changing nanoparticles visible to the naked eye and requiring no lab equipment to enable rapid detection. CodeClear has partnered with leading tech design/engineering firms to create a single sample multiplex diagnostics tool capable of detecting multiple threats from

infectious disease and environmental contamination. The veteran-led company recently was awarded a NIH RADx grant for COVID-19 rapid testing using patented quantum dots and has secured a cooperative research and development agreement (CRADA) with the U.S. Army Combat Capabilities Development Command (CCDC) Chemical Biological Center.

### **Nasoesophageal obstructer**

The Nasoesophageal obstructer (NEO) is an airway device designed to protect and maintain a casualties' airway during medical care. It is designed to prevent airway obstruction from the tongue and prevent aspiration of gastric contents into the lungs. Airway obstruction is the 2nd most common cause of preventable combat deaths and aspiration of gastric contents remains the leading cause of airway management related deaths. This patented technology resists dislodgement, even with extreme patient movement. It is lightweight, easy to use, and extremely versatile. These features allow the NEO to improve warfighter survival making it easier for providers to address injury and lethality closer to the point of injury.

### **OXY-FIT DISPOSABLE EAR PULSE OXIMETER SENSOR HOLDER**

The goal of maintaining the survival, health and performance of warfighters during times of war, special operations and routine operations require many levels of support. OXY-FIT ear oxygen saturation sensor holder device, adjustable, durable, made of conforming 'memory material' fits every person child to large adult. It secures the oxygen sensor and wire to the earlobe providing a vital level of support. Whether the warfighter has sustained a traumatic injury that needs immediate assessment and treatment or requires transport to a treatable location, it is crucial to have that ability. Stress caused by a family member that is hospitalized at home can interfere with the readiness of the warfighter. OXY-FIT is there to bring immediate and accurate information to those providing care for warfighters and their families.

### **FBB BioMed Precision Inflammatory Detection of Disease**

This blood test technology precisely measures inflammatory responses that enable early identification of existing disease processes and exposure to known and novel pathogens or new biological agents. The power of RNA detection technology allows for medical staff to determine if personnel have been exposed to infectious agents regardless of the identity of the pathogen. Medical staff will be able to identify, isolate and treat those individuals at risk for ensuing health threats. The technology was tested in a proof-of-concept study of blinded samples from Dengue Fever patients and controls. All the samples were correctly identified with respect to their status of healthy, uncomplicated or severe Dengue Fever. This technology could play a critical role in keeping an active military healthy and productive.

### **Biotek Shield by Aero Biotek (PWI)**

The pandemic has adversely affected the sense of safety people feel when in enclosed environments. Currently there is no way to stop airborne viruses like COVID-19 from freely circulating in the air. Aero Biotek is developing a device called Biotek Shield which will neutralize 99.9999% of airborne pathogens. Biotek Shield can be designed to be installed in the air conditioning system of any environment and uses UVC (ultraviolet) light technology to neutralize pathogens like bacteria and viruses-including SARS and COVID-19. Biotek Shield's relevance to the combatant command is as force protection and medical.

### **Rapid Response & Tracking Software**

TresCare Software speeds up recognition of a Warfighter's deteriorating conditions (i.e. sepsis, covid, lower respiratory tract infections, pneumonia, etc.) in any Military Health System (hospitals, medical centers, clinics, rehabs) that Warfighters depend on for their health care to improve the rate of survival. The heart of TresCare Software is our Track & Trigger feature that revolves around tracking and monitoring 7 vital signs. Vital signs are the Warfighters story of his/her health; before physical symptoms appear, it is the vitals that first change. By addressing even subtle changes in the Warfighter's vitals, healthcare staff can provide better patient outcomes to our Warfighters before worse medical events occur due to delays in recognition of infections and slow initiation of treatments.

### **TresCare Rapid Response Software and SWOT Analysis**

TresCare Software is an advanced monitoring system that enables rapid identification of lower respiratory tract infections, in their incubation periods, such as COVID-19 and Pneumonia as well as dehydration, fever and heart failure. Our software gives our warfighter and their team an advantage by identifying COVID-19 in the incubation period, before physical symptoms appear, which can result in minimizing to eliminating the spread of COVID-19 to other warfighters. TresCare does this by monitoring 6 vital signs: respiratory rate, blood pressure, heart rate, blood sugar, oxygen saturation and body temperature. The warfighter is immediately notified with a medical alert when the software detects a slight change in any of these vital signs which might signal or lead to a serious condition. Vital signs are indicators that require special attention; addressing abnormal vitals immediately helps reduce the risk of unnecessary harm associated with unintentionally missed vitals and provide an exceptional level of healthcare by providing quality care and better patient outcomes.

### **Remote Wound Care Prevention and Monitoring System**

The Wound Care Prevention and Monitoring System (RWCPMS) is a patented weight-scale like platform uniquely designed for diabetic feet by properly blow dry between toes and soles of feet deterring bacterial growth. It has a built-in camera to capture images to facilitate proper foot inspection. The images are transmitted to a web platform for ongoing footcare prevention, deliver ongoing wound care and evaluate post-surgical care. RWCPMS replaces the ineffective antiquated way of observing diabetic feet and provides for an earlier medical intervention. The web platform can be shared with loved ones forming a team approach to that person's care by allowing supervision of proper diabetic foot care thus managing our Veterans from the comfort of their home ultimately maximizing their quality of life and independence.

### **Krampade**

Krampade is a high-potassium sports drink that helps prevent and stop cramp formation. It also increases performance and speeds recovery. Because it supports more efficient sweating, its use helps combat heat stress. In short, Krampade is a revolutionary, novel approach to a sports drink offering a complete human performance optimization solution.

### **Safe Portal Tech / Active Shooter Sanctuary**

Safe Portal provides security in an active shooter situation. Safe Portal can be installed in any existing building or location with minimal effort. Safe Portal provides 720-degree protection. Safe Portal can take on the appearance of any existing wall or structure so as not to be detectable to an active shooter.

### **Narwhal Skin**

CSM will provide divers the ability to conduct operations in extreme weather conditions while still being safe and effective, boosting their morale and commander's confidence.

### **RUMI: 30-Second Bio surveillance Antigen Detection Test**

The RUMI is a diagnostic photonic system for bio surveillance, chemical and biological warfare during infectious spread, epidemics, and pandemics. The rapid test is a field detection unit for warfighter disease status in real-time, anywhere – without the use of a lab, on-base or off-base. The system incorporates real-time data sharing capabilities of test results for preparedness and protection. Currently, we are developing an engineered molecular enzyme for detecting COVID-19 in the RUMI, a cell-phone sized device, in 30 seconds. Notes: remove rate of detection, The device can also be used for a rapid response against biological and chemical warfare, field detection unit diagnostic system. The device uses photonics to amplify a pathogen signal within 30 seconds.

### **Blood test for measuring and predicting disease severity**

Our blood test for disease severity is a breakthrough for helping clinicians make critical medical decisions on which individuals are at risk of developing severe symptoms, rendering them potentially unable to perform their duties. Because we look at the immune response to pathogens, this blood test should have wide applicability for acute diseases we know and those diseases that come from novel pathogens. We have run proof-of-concept studies for five distinct diseases, all of them successful, providing hard evidence of our technology's utility. Our first product will be a novel Disease Severity Test for COVID-19.

### **Electronic Security Strap**

Safely securing firearms in open carry, concealed carry environments, and gun storage is challenging. Invented with protection for children, homeowners, and first responders in mind, the Electronic Security Strap (ESS) with a snap-type locking device provides maximum protection requiring unique user fingerprint combinations with an accelerometer trigger to release the locking mechanism. The ESS is designed to secure firearms but adaptable to a wide range of asset security applications. This patented strap technology is a TRL 2 under current efforts of advancement.

### **Universal Self-Retaining Surgical Retractor System**

Uncontrolled bleeding after injury is a major cause of death in both military and civilian patients, and surgical retractors are tools used by surgeons to facilitate bleeding control and prevent death as a result. Designed for both civilian and military operating rooms including austere and forward-deployed settings, our patented surgical retractor technology delivers a portable, non-table-fixed, self-retaining system resulting in superior hands-free exposure of the surgical field. Providing a unique combination of speed and functionality, our technology improves the ability of surgeons to rapidly control life-threatening bleeding in all operating environments, thereby saving lives of Warfighters and civilians alike.