

## LIGHTWEIGHT OXYGEN CONCENTRATOR

Award winning concept and design, to provide oxygen and save lives for the military and developing world

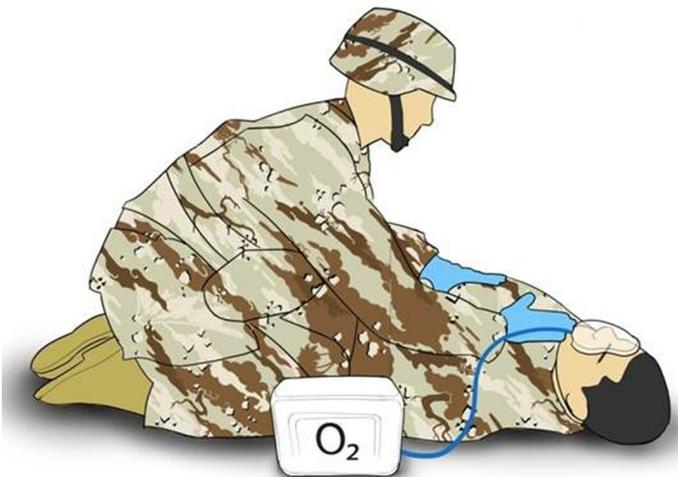
### THE CHALLENGE >

During the conflicts in Iraq and Afghanistan, improvised explosive devices (IEDs) caused over 50% of combat casualties. The combination of wounds caused by an IED together with damage to the lungs severely compromises the body's ability to deliver oxygen to vital tissues. The 'Golden Hour' is even more relevant here than in civilian cases, so making oxygen available on the front line would be a decisive step in improving survival rates and outcomes.

### THE SOLUTION >

Since other forms of oxygen are impractical on the front line, our response was to design an integrated oxygen concentrator with a lightweight engine to create a highly efficient and extremely compact oxygen source. The unit can be run on a range of fuels, including standard diesel.

We worked with expert users to understand the requirements for the system, creating a laboratory demonstrator capable of producing high purity oxygen using both butane and diesel fuels and defining a feasible technical specification for a developed system.



The oxygen concentrator won the Defence and Security award at The Engineer Technology and Innovation Awards 2011. Following this success we set out to identify opportunities to put this work and research to wider use and extend it beyond the military. And so we commissioned research from the University of Cambridge Judge Business School who identified that the technology could be repurposed to address a pressing need in hospitals and clinics within the developing world.

Of the 10 million children that die worldwide each year\* 95% occur in the developing world. A staggering 4 million of these deaths occur through respiratory distress syndrome and pneumonia after birth. A large portion of these deaths could potentially be mitigated through the provision of adequate and timely oxygen supplies.

The World Health Organisation has previously recognised that although oxygen-provision is a basic requirement in saving lives, oxygen is rarely available, and is often lacking in the developing world. Current solutions include oxygen concentrators that are powered by unreliable electricity supplies and heavy, expensive oxygen cylinders that rely on transport infrastructure. These do not provide a workable solution for many remote hospitals and clinics in resource poor settings, leading to both unnecessary deaths and excessive expenditure in medical aid.

Cambridge Design Partnership is now seeking NGO or device-manufacturer partners to support the development of this design into a product that can provide a reliable supply of oxygen for health settings in resource constrained countries.