PROTECTIVE
ENGINEERED SAFETY

Corporate Overview

April 2023

Company overview

Protective works to create and apply engineered safety solutions because we believe everyone deserves to go home safely

- Protective offers a series of world first, patented solutions to some of the most serious safety risks to modern work sites and communities. We believe in the days of modern technology, nobody should die or be seriously injured at work or home
- Our products are designed and manufactured in Australia for the global market
- Our solutions are market leading with broad applicability across multiple industries including construction, transportation and mining:

GoUpSafely	Aerial machine high voltage (HV) protection system
MEWP Shield	Crush Protection for Elevated Work Platforms
NeutralSafe	Broken Neutral Protection for commercial and residential properties
Intrinsically Safe Connector	Wireless and connection-free powering and changing of light fittings and globes

- Protective delivers value by improving companies' management of the Hierarchy of Safety Controls, substituting or supplementing administrative controls with engineering controls to remove the human factors inherent in many safety incidents
- Protective has won the WA Rio Tinto Emerging Innovator of the Year 2022 and State Telstra Business Awards 2023, was a finalist in the Australian Technologies Competition, the RISE Business Awards and a participant in the EDP Starter Accelerator Program in Houston, USA

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Leadership

Protective's leadership team is comprised of diverse individuals with exceptional industry experience

Karl Rosewarne

Managing Director

- Responsible for all technical staff, overseeing project management
- Ensures manufacturing processes are practical and efficient and sets guidelines to ensure manufacturing guidelines are achieved
- Diploma in Electricity Supply Industry in HV System Operations, with over 35 years of field experience in the electrical industry
- Karl has 8 patents under his name
- Previous roles include Senior High Voltage Switching Controller and Chairman of the Safety Committee at Western Power, Senior Networks/Power Advisor of Rio Tinto, Electrical Superintendent for Resolute Mining Tanzania, and Supervising Electrical Inspect at Service Stream

Steve Davison

Chief Executive Officer

- Responsible for setting strategy, articulating the CVP, driving the company's development and guiding it towards sustainability and long-term success or sale
- 25+ years international and domestic experience developing and executing business strategy, innovating products and extending and developing markets in highly regulated and complex environments
- Prior experience in Big 4, Financial Services, Chamber of Commerce and FMCG
- Holds a Bachelor of Commerce and MBA
- Graduate of the Australian Institute of Company Directors (GAICD)

Richard Kabzinski

General Manager – Technical Development

- Oversees research & development function
- Supports CTO in technical development, ensures the quality design, manages deadlines & deliverables for EDM, and manages technical support for protective's products
- Richard has 7 patents, with applications for a further 5
- Held management and engineering technical development roles at several large and listed companies over his career

Jason Jordan

Business Development Manager

- Development of new business plans and executing sales strategies
- Contributes expertise to production planning, quality and customer service standards, engages marketing to create marketing campaigns, initiatives and new product introductions
- Former CIO of Sunwater and CS Energy with significant experience in releasing new technologies within the utilities industry
- Tertiary qualifications in Commerce and Information Technology

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Research & Development Capabilities

Protective has well-established R&D Capabilities and Processes that are supported by quality facilities and infrastructure

Research & Development Capabilities

Protective has advanced R&D facilities in its Malaga office comprised of a 320m^2 workshop space and 230m^2 office and R&D laboratory space. The facilities feature state of the art manufacturing and testing capabilities, including an in-house high voltage 11kv stimulated power line and testing area to the requirements of ASTM F3283. This ensures that every device manufactured is tested in a real world environment.

The facilities also include PCB prototyping, 3D Printing, electronic assembly and programming workstations. Skill sets included on the team are electrical and electronic design, RF Design and software development.

Previous and Current R&D Partners

Previous and current R&D partners include some of the largest names in industry both as suppliers and primes.

SKYJACK, HIAB, CATERPILLAR, Haulotte, Chevron, SAFESCAPE Practical Innovation, Rio Tinto, KOMATSU, JLG, BHP, normet FOR TOUGH JOBS, TRT

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Product Development Team

Protective's product development team is integral to its success in developing advanced safety technologies

Karl Rosewarne

Managing Director

Co-Leads Product Development Team

- Karl has 8 patents under his name
- Diploma in Electricity Supply Industry in HV System Operations, with over 35 years of field experience in the electrical industry

Richard Kabzinski

General Manager - Technical Development

Oversees research & development function

- 48+ Years Experience
- Supports CTO in technical development, ensures the quality design, manages deadlines & deliverables for EDM, and manages technical support for protective's products
- Richard has 7 patents, with applications for a further 5

Reazul Islam

Senior Electronics & Mechatronics Engineer

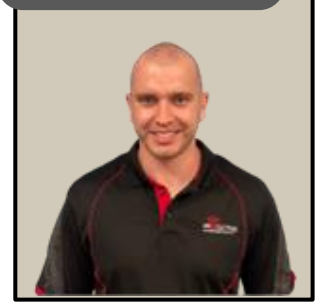
- Dual Degree in Mechatronic Engineering and Mechanical Engineering
- Electronics development, PCB design, mechanical and mechatronic interfaces and devices, programming and testing, and app and Bluetooth integration

Conor McMurtrie

Electronics & Mechatronics Engineer

- Bachelor of Engineering (Mechatronics, Robotics, & Automation Engineering)
- Electronics development, PCB design, mechanical and mechatronic interfaces and devices, programming and testing, and app and Bluetooth integration

Dale Harding



Mechanical Engineer

- Bachelor of Engineering (Mechanical)
- Mechanical design, prototyping, 3D printing, and product design

Alex Eades

Electronics Assembly Technician

- 30+ Years Experience
- Assembly and programming of products, testing and quality activities in accordance with QMS, testing and fitment of prototype systems, tracking production progress on MRP systems, and packaging and shipping of protective's products

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Our Mission

Protective develops and manufactures products to provide engineered safety solutions and prevent these accidents

We are motivated to do this by the devastating impact of electrical accidents

Because everyone deserves to go home safely

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What we do:
Product Overview

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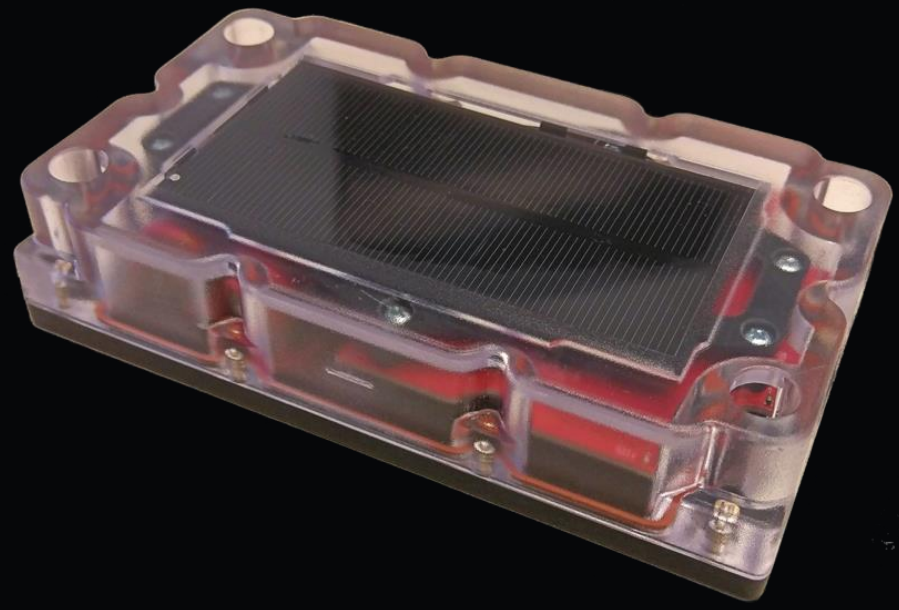
Aerial High Voltage Detection System

GoUpSafely

Protective's GoUpSafely system represents a revolution in aerial machine safety. Proven throughout the world, GoUpSafely is the only patented system able to prevent machines from contacting power lines whilst allowing the machine to move safely away after detection. Our state-of-the-art sensing technology ensures that every detection is a real power line eliminating nuisance alarms and ensuring operator safety.



- Detect overhead powerlines
- Reduce risk of electric shock
- Avoid costly damage
- Alarm and motion stop options
- Stop motion towards overhead powerlines
- Allow motion away from overhead powerlines
- Retrofit to most machine types
- Monitor control motions

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Product Benefits

- Free from interference from radio and other devices
- Custom military-grade wireless communications
- Reduce risk and improve workflow efficiency
- Improved reliability in machine safety
- Reduced incident related costs

The current problem

Machine operators working near HV power sources often focus on their payload and not the surrounding environment

Electrical Incident Statistics

- From 2011-2021, 39% of all electrically related workplace fatalities were caused by overhead power lines*
- The estimated cost of an electrical shock incident (avg) is US$158k direct and US$174k indirect cost, total of US$332k**
- Globally, an estimated 4,700 people are killed in electrical accidents annually, 44% are attributed to power line contact*
- 45.7% of all electrical fatalities in the USA were caused by contact with overhead power*
- Similar numbers reported in Australia (48%) and The UK (39%)*
- 8.4% of all electrical fatalities in the USA were caused by safety control / administrative failure

Current Mitigation efforts

- Current mitigation strategies focus on training, administrative controls (i.e., lockout procedures) and human intervention (i.e.. spotters), not engineered solutions
- Training courses educate operators on the dangers of power line contact and safe operating methods, however incident reports show operators lose focus, cut corners or miss critical hazards resulting in serious incidents
- A small number of companies offer technology to warn of the presence of power lines, however they are reliant on human intervention in the critical stages to prevent an accident
- None of the current solutions are truly engineered solutions to inhibit movement towards dangerous HV sources

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* https://www.esfi.org/
** https://www.osha.gov/safetypays/estimator

The Solution

Protective's GoUpSafely system provides an engineered solution to address a global problem in HV power line strikes and flash over incidents often leading to serious injury and fatality.

By utilising innovative sensor technology and patented filtering capability, GoUpSafely identifies dangerous proximity to HV sources alerting the operator to the risk via audio and visual warnings before ultimately stopping the machine from moving into the high-risk detection zone.

Easily installed onto a range of heavy machinery, GoUpSafely represents an innovative approach to solving a serious risk for a range of industries across the world.

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Competitors

Current GoUpSafely competitors:

- Voltek NS (US Based) – Simple indication system with no filtering. Linear wire running the length of the boom with wired siren and visual indicator. Estimated cost - US$7,000. Can use e-stop or hydraulic dump to stop boom on detection, but unsophisticated
- SigAlarm (US Based) – Wired / wireless sensor system. Indication with ability to use e-stop or hydraulic dump to stop boom on detection. Base system single sensor = US$5,495
- ProxyVolt (Australian Based) - Antenna system with no filtering. Very basic detection capability prone to nuisance alarms. Cost unavailable

GoUpSafely competitor comparison

Comparison of other solutions on the market

	GoUpSafely Ver.3.0	Voltek NS	SigAlarm	ProxyVolt
Detection of 50 & 60Hz e-field by capacitive coupling whilst stationary	Y	Y	Y	Y
Automated detection of 50Hz or 60Hz	Y	Y	Selectable 60Hz or 50Hz	NO - 2 versions
Software filtered Wireless power detection in 50Hz & 60Hz	Y	Unknown	N	N
CAN BUS Connectivity to modern machines	Y	N	N	N
Stops Movement of machine w/ Optional Interlock	Allows movement away from HV source	Y – Clear alarm button must be activated	Override button – 15 seconds	N
Wireless link to control module	Y	N	Y	N
Logs date, time, & warnings	Y	N	Y (additional cost)	N
Flash upgradeable firmware in base unit	Y	Unknown	Y	N
8 - 32 Volt operation for base unit fully protected against reverse polarity connection, brown-out and transient voltages, in accordance with ISO 7637	8/32V	12/24V	12-48V	12/24
Self-checking for communication status	Y	N/A	Y	N
HV test wand for sensor/system Pre-start functional checks	Y (Standard)	N	N	N
Bluetooth/App for system setup/monitoring	Y	N	N	N
Maximum # of sensors	No defined limit	1 Wire antenna	12	Several plate or wire antennas
Sensor has on-board status and diagnostic lamps	Y	Dumb wire	N	Dumb plate or wire
Sensor - small size single module	Y	Y	N	N
Solar Powered Sensors	Y	N/A	Y	N
Sensors have shock absorbing mounts	Y	N/A	N	N
Sensors offered with magnetic feet mounts	Y	N/A	N	N/A
Internal and External Audio Alert/Horn/Siren	Y	External only	Y	Y (additional cost)
Adjustable warning limits (Factory set to comply with International Clearance Standards)	Y	Y	Y	Y
IP67 rating - Sensors	Y	Y	Y	Y
IP69 rating - base unit (not WOP)	N	N/A	N	N

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GoUpSafely MK-II wireless specifications

Sensor	
Power	Mil-spec custom NiMh – 3 cells charged by Solar Panel
Standby Time	Inactive, no sun, 55 days
Minimum direct sun to maintain battery	6 hours per day, 20 alarm events per day
Wireless	Proprietary 900Mhz ISM band Mil-spec protocol
Wireless Range	30M line of sight[1]
Hazard Sense Distance (E-field)	Factory calibration – 425mm @ 1kV, 50Hz for alarm condition[2]
	Meets ASTM F3283/F3283M – 18
Hazard Sense Distance (B-field)	TBD
Size	150L x 80W x 30H
Net Weight	250 grams
Mounting	Four mounting points, M6 clearance holes
	Magnetic or stud mount on resilient stand-offs
Operating Temperature	-30 to +85 °C
Storage Temperature	-55 to +105 °C
Ingress	IP67 in accordance with ISO16750 Section 5.4.3
Enclosure	High impact Polycarbonate, UV stabilized

Base Controller	
Power	12 or 24 volt automotive (4.8 – 40 VDC) Max 100mA
Internal Power Hold-up	10 seconds for orderly user alert and shutdown[3]
Operator Interface	GUI via Bluetooth® to Android® device
Wireless	Proprietary 900Mhz ISM band Mil-spec protocol
Wireless Range	30M line of sight
Solenoid Drivers	Outputs to solenoid drivers to 4A @ 12 or 24 VDC nominal
Opto relay drivers	Sink, 50mA 100VDC max (interface to ext lamps, sounders etc)
Size	170L x 120W x 35H including connector allowance
Net Weight	200 grams
Mounting	Two mounting points, M6 hard-mounted
Operating Temperature	-30 to +85 °C
Storage Temperature	-55 to +105 °C
Ingress	IP69K in accordance with ISO16750 Section 5.4.3
Enclosure	High impact glass-filled nylon, UV stabilized
Electrical Susceptibility	Meets ISO7637 parts 1&2

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Note 1: Wireless range is dependent on the location of Sensors and Base Controller, 'line of sight' assumes no obstacles are in the path between sensor and base. High gain antennas may be fitted to extend range in excess of 100m
Note 2: Standard test conditions as per ASTM F3283/F3283M – 18, 'Standard Specification for the Manufacturing of High-Voltage Proximity Alarm to be used for the Detection of Overhead High Voltage Alternating Current (AC)', solar panel parallel to transmission line with sensor mounted on grounded metal plate 300L x 300W x 3D with magnets on resilient stand-offs.
Note 3: Brownout detected at 8.5 volts and if the supply voltage is lower than 8.5 volts for more than 5 seconds, an orderly shutdown is initiated.

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