

#### THE CUSTOMER

SmartWater Technology Ltd is an international crime fighting and crime prevention company with an established track record for detecting and deterring criminal activity.



#### REQUIREMENTS

To design the electronics to control the Smartwater discharge pump

#### RESULTS

- Microcontroller based pump control solution
- Reduced unit cost
- Electronics and firmware designed for maximum flexibility with future enhancement in mind



#### BACKGROUND

SmartWater's forensic spray system is an anti-intruder device that can be integrated with alarm systems to protect points of entry and high value areas.

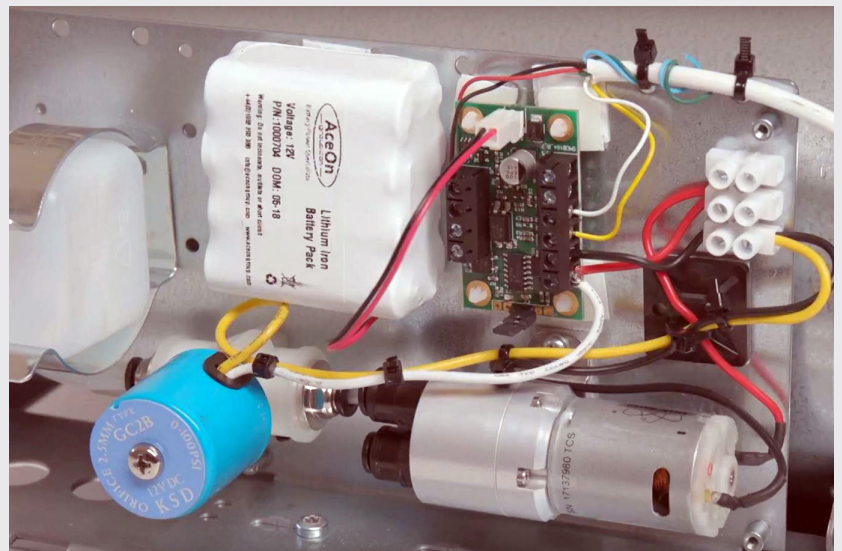
When the alarm system is triggered by an intruder, the SmartWater device is activated, marking the offender with a traceable liquid, linking them and the stolen property back to the scene of the crime.

The liquid leaves a long lasting and unique identifier that is only visible under ultraviolet black light.

#### THE CHALLENGE

Sorion were approached to design a product that will monitor the alarm output from a generic intruder alarm panel and to provide a **timed discharge of SmartWater** if the alarm triggers and the presence of an intruder is detected in the spray area.

The main objective was to replace SmartWater's existing discrete solution with a microcontroller based pump controller that is easy to use and offers durability. Reducing the overall unit cost was also part of the brief.



The SmartWater forensic spray system

The required functionality was for the **SmartWater pump to be run for 30 seconds** if and only if the intruder alarm has been triggered and the presence of the intruder has been validated within the spray area. A PCB mounted LED was required to indicate system status.

## THE SOLUTION

The product development was undertaken in line with Sorion's standard design process, consisting of the following discrete phases with defined deliverables: customer requirements capture, specification, hardware design, prototyping, software design, coding and validation testing.

### HARDWARE DESIGN

The hardware design stage began with research into suitable components followed by entry of the circuit schematic into our CAD system. The product was designed to operate on a **tight power budget** to provide for in excess of 24 months standby operation with sufficient reserve capacity to fire the pump for 30 seconds if an alarm event occurs at any point in that time.

The bill of materials (BOM) was then created, mindful of the cost/quality brief. Then the printed circuit board was laid out, again using our CAD system together with the extensive experience of our design engineer to optimise placement and tracking. The board was designed according to the physical constraints outlined in the product specification for compatibility with the existing product enclosure. The product files were then released for an initial prototype build.

### PROTOTYPING

5 prototypes were manufactured, assembled and tested.

### SOFTWARE DESIGN & CODING

The software code was designed to meet the functional requirements specified by SmartWater. In addition to this, software was written to display the status of inputs to the system to aid installation, commissioning and fault diagnosis.

The controller was designed to be simple and intuitive for the user while allowing for maximum flexibility with future enhancements in mind.

We are proud to have played a part in the project, helping SmartWater to quickly and cost effectively bring the new feature to market for their already successful SmartWater spray system.

## ABOUT SORION DEVELOPMENTS

Sorion Developments is Sorion's electronics design and development function.

The services encompass electronics product design and development, printed circuit board design and embedded firmware design and coding.

We pride ourselves on providing a pragmatic, holistic approach to the development of your product from initial concepts through to a fully engineered solution.

**To learn more about how we can help you with your electronics design project, contact [sales@sorion.co.uk](mailto:sales@sorion.co.uk) or call us at 0121 454 8966.**

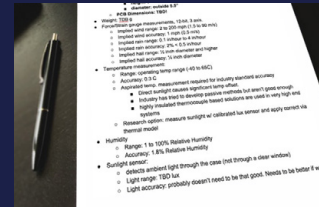


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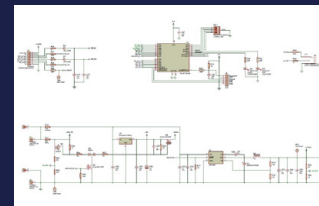
## OUR PROCESS



Customer requirements capture



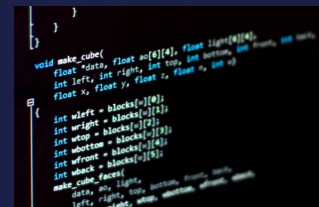
Specification



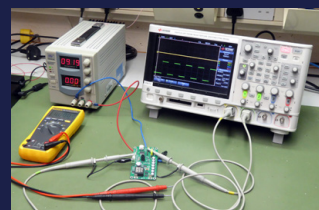
Hardware design



Prototype hardware



Software design and coding



Validation testing



Happy customer

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