

GX



SOPHISTICATED
MECHANICAL
PACKAGING TO HOUSE
SENSORS FOR
HOSPITAL SAFETY
SYSTEMS.

THE CHALLENGE

Metrasens is the world's leading provider of advanced ferromagnetic detection system technologies, detecting and warning staff before potentially hazardous items cross MRI room doorways.

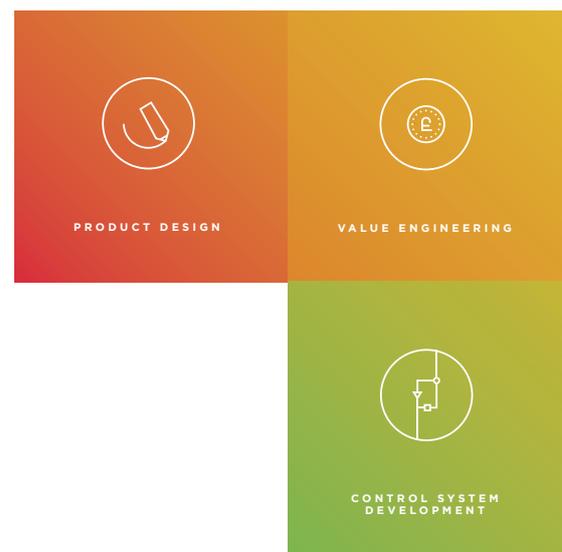
MRI scanners produce a strong magnetic field that can produce the so-called "projectile effect", where approaching ferrous items, such as hair pins, are pulled with great force towards the magnet. This has caused serious injuries and even fatalities to medical staff. Metrasens wanted to produce a new product that would be used in conjunction with their Ferroguard system to detect the open or closed position of the door on the MRI suite. This had to be achieved without the use of conventionally wired electrical detectors. Using optical sensors the new product had to be wall or ceiling mounted or attached to the main Ferroguard device with all variants placed outside the door to the MRI scanner suite.

Having developed the core Ferroguard technology, they approached GX for their help to design sophisticated mechanical packaging that could be used to house their door detection sensors. The design needed to allow for the wide variation in doorway architecture around the world, as well as being designed for manufacture to maximise efficiency and minimise tooling and production costs.

THE SOLUTION

Due to the wide variation in doorway and room layout architecture around the world, the design team at GX needed to engineer a solution which could be quickly and easily configured to suit different buildings, yet robust enough to cope with years of life in a busy and challenging hospital environment. The design equally needed to be adaptable enough to overcome height differences and any electrical or civil engineering variations at the MRI suites.

QUICK FACTS



The team at GX designed and developed a set of family tooling moulds for a modular system, as well as creating the main electronic control housing. The different component parts could be used to build a range of different 'products' using the interchangeable modules.

This approach meant the sensor casing was adjustable enough to be fitted in a range of situations and environments. By using a modular system, parts could be reused or even replaced easily without the need for an entirely new sensor being fitted.

Depending upon the layout, the sensor could be mounted at the bottom of the majority of Ferroguard sensor poles, or as a stand-alone unit or even recessed into the wall either side of the entry door to the MRI suite.

Another design requirement was to incorporate a second sensor that provided real time information on door movement. The ideal locations and orientations for the doors are varied, so the design needed to cope with four classes of door opening:

- In-swing left-hinge and In-swing right-hinge
- Out-swing left-hinge and Out-swing right-hinge

Information from the sensors is sent to a control unit known as the "Hub" which is mounted out of the sight of staff and patients. The metal enclosure for the Hub was designed for ease of installation, low-cost manufacturing, robustness and electrical integrity, while also fitting in with Ferroguard's corporate product identity.

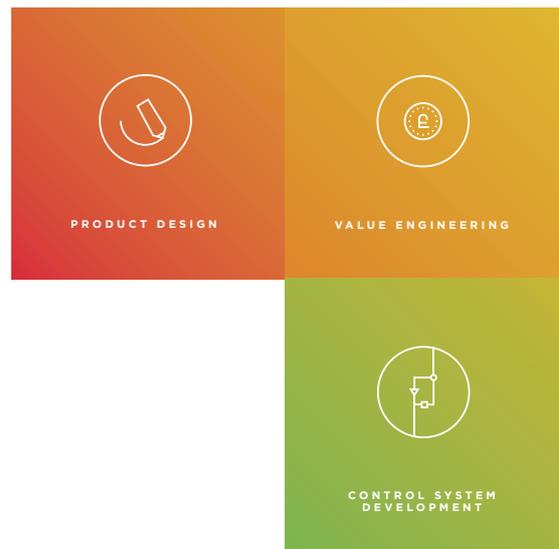
THE RESULT

The Metrasens Ferroguard sensor casing has 18 component parts to build a range of different 'products', creating a flexible detection product that can be used in a range of hospital environments.

GX used family tooling to reduce the cost of creating component parts. The team at GX used their family tooling mould to create injection moulded parts for the optical enclosure and mechanical sub-assemblies. This involved some complex problem solving, but by creating a minimum number of family tooling moulds they successfully reduced tooling costs.

Many of the components are multi-functional and designed to ensure easy assembly. The design successfully met the need for components to operate at extremely tight tolerances, allowing no room for error.

The new generation Ferroguard product has been on the market for several years and continues to be installed in hospitals across Europe, North America and Asia. The design team at GX is still involved in the supply of the moulded components.



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TECHNICAL DATA

ELECTRONICS

All sensors and electronic components were provided by Metrasens.

VALUE ENGINEERING

The GX team developed family tooling moulds and designed the system to utilise common parts. This made it possible for the sensor housing to be assembled as a modular system, reducing the cost of manufacture and ensuring ease of assembly.

LOW VOLUME MANUFACTURING

GX initially supplied 1,000 sets of components to Metrasens. They now resupply Metrasens on an ongoing basis in regular delivery batches of 50 to 100 sets of parts.

RAPID PROTOTYPING

It was essential that the modular components worked properly together before investing in family tooling moulds. For this, GX created rapid prototype vacuum castings to create accurate prototypes for testing.

MECHANICAL & INDUSTRIAL DESIGN

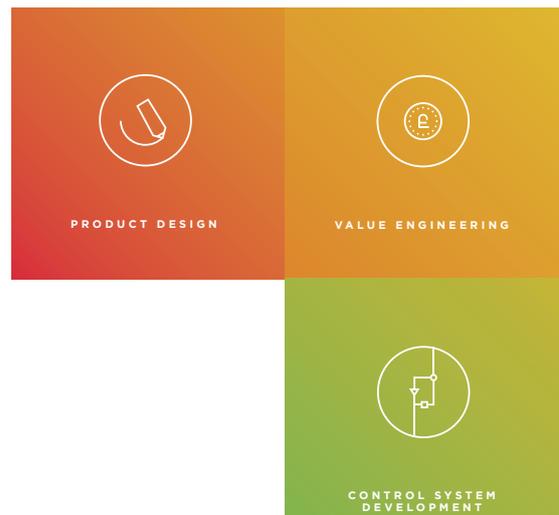
In many cases, the mouldings needed to house components from a functional and mechanical design point of view, whilst also creating the external surfaces of the product. This made the combination of mechanical and industrial design vital for the components to completely fulfil their purpose.

OUR SERVICES

-  ELECTRONICS
-  VALUE ENGINEERING
-  SOFTWARE DESIGN
-  REGULATORY SUPPORT
-  RAPID PROTOTYPING
-  OPTONICS
-  MECHANICAL ENGINEERING
-  INDUSTRIAL DESIGN



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PRODUCT DESIGN

VALUE ENGINEERING

CONTROL SYSTEM DEVELOPMENT