iSTEC

EXPERIENCE. INNOVATION.

COMPANY BROCHURE 2022

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EXPERIENCE. INNOVATION.

Capability

ISTEC has exceptional strength in the engineering design and development of new innovative systems, with a large team fully equipped with the latest 3D Solid Modelling and Finite Element Analysis (FEA) software. ISTEC adopt a very proactive approach with a strong desire to work as part of the customer's team throughout the design process and beyond.

With many existing products in-service, across Land, Sea and Air domains, the engineering team look to either adapt 'off the shelf' in-service solutions, or establish bespoke solutions to ensure full compliance with customer requirements.

All design work is undertaken in full compliance to the ISTEC design processes and procedures that ensure critical areas are addressed during the design phase, such as: compliance with user requirements; ease of operation and maintenance; ensuring a modular design and obsolescence management.

Background

ISTEC Services Limited, (ISTEC) is the United Kingdom's principal supplier of high quality, precision engineered small-arm and medium calibre gun mounts, weapon stations and ancillaries.

Formed in 1989, ISTEC continues to be a leading designer and manufacturer of specialist military equipment which supports the modern warfighter worldwide, across Land, Sea and Air platforms.

During that time, ISTEC has developed as a dynamic, customer-focused company; delivering pragmatic advice and high quality products in a timely manner.

ISTEC is an ISO 9001:2015 accredited company with a reputation for providing robust, reliable and effective weapon mounting equipment and ancillaries in support of continuing, domestic and overseas requirements.

ISTEC's mounts and weapon ancillaries are currently supplied to the world's leading defence integrators and operated by users worldwide, as well as the UK.

ISTEC specialise in fully integrating a customer's inventory of crew-served weapons, either retrospectively onto vehicle platforms or by design at the concept stage.

Editorial

As ISTEC continues to evolve, this year has already seen the successful launch of new products across differing technologies and platforms. The ISTEC Laser Warning System (LWS) continues to attract interest and is undergoing further development for an overseas customer. The ISTEC AIR domain portfolio of products has been extended once again in recent weeks, with specific new designs to support exciting new contracts for Helicopter Weapon Systems. This edition of the ISTEC brochure includes an in-depth feature on the AIR systems

Notoriously seen as one of the hardest battle spaces, in which to be successful; in this edition, ISTEC's approach to design and development within the limits of strict mandatory aerospace standards, are examined.

Along with the Land, Sea and Air product development programmes, customer focus remains of fundamental importance, continuing to support both new and existing customers; meeting challenging User requirements; and supporting through life cycle of ISTEC systems and sub-systems.

With worldwide travel now easing, the ISTEC team commence visits to Defence Exhibitions around the world, with strong attendance, in particular at Eurosatory in Paris in June. Further details can be found on both the ISTEC website and on the LinkedIn page. ISTEC representatives will be only too happy to meet you, so please feel free to make contact in advance via the website www.istecservices.com or the LinkedIn page.

EXPERIENCE. INNOVATION.

ENGINEERING FOR AEROSPACE

ISTEC design and manufacture aerospace weapon mounts for a variety of customers and platforms globally. ISTEC have a range of fully qualified and certified aerospace mounts, which form the basis of any new aerospace weapon mounts.

When designing a weapon mount for an aerospace application there are a number of challenges which need to be considered in comparison to a land or naval based system. Whilst ISTEC can draw on many years of experience designing and manufacturing land and naval based systems, there are a unique set of requirements, which are specific to aerospace applications. ISTEC are fully adept with these requirements, having designed and qualified weapon mounts as part of aerospace platforms, which have achieved type certification.

ISTEC aerospace weapon mounts are designed in such a manner that the mounts are as light as possible, whilst still ensuring that the required loading conditions can be achieved throughout the operational life of the mount. This creates a unique set of design parameters, whereby optimisation of each component is critical in terms of strength versus weight.

To assist with the validation of each component, ISTEC utilises the most current finite element analysis (FEA) tools to carry out both static and dynamic simulations. Within these analysis tools, the loading conditions are inputted as boundary conditions. The peak stress on each component is then analysed and checked to ensure that there is a positive safety margin to the yield strength of the material used to realise each part. The safety margin can be used to optimise each component such that there is no unnecessary additional mass, whilst satisfying the strength requirements.

When manufacturing aerospace weapon mounts there are a very stringent set of requirements not only dictated by the customer, but also by legislative bodies such as the CAA. Aerospace manufacture requires a 'cradle to grave' traceability process, ensuring all raw material sourced is to an aerospace release, with full traceability back to the mill, along with composition tests to ensure that the material alloying elements are within the required specification minimums.

For each manufacturing batch, first article inspection reports (FAIR) are required. These reports contain all detailed information to document that when each component is manufactured, it fully complies to the standard and specification called out on the drawing. For each manufactured component a first article inspection report contains; raw material certificates, manufacturing route/job cards, CMM measurement reports and finishing certificates. All of these reports are individually inspected and verified, at which point the overall weapon mount assembly FAIR can be compiled.

As with all aerospace equipment, prior to a mount being released and fitted to an airframe, a full qualification test programme is undertaken. These test programmes are used as the final stage of validation of the weapon mount design and are used to further validate the FEA that is carried out during the initial design phase.

Test programmes are intense, and predominantly consist of vibration and shock testing, as well as environmental exposure tests. The vibration and shock tests are designed to fully life the weapon mount and simulate 10,000 flight hours or 20 years of service life. These tests ensures that, when exposed to the forces and vibrations, expected during operational life, the weapon mount will perform as expected and not fail.

The environmental exposure tests are also highly accelerated life tests, designed to expose any potential corrosion issues. There are very strict requirements for the pass/fail criteria for these tests, to ensure that the mount is suitable to be operated in all environmental conditions, throughout its service life.

The final part of the certification process is a live firing test. Once all the engineering, qualification and first article inspection reports are completed and finalised, the mounts are released under a blue banding for experimental test flight. A full firing campaign, of a number of thousand rounds, is then conducted with the aircraft in all operational conditions.

The level of certification and specific testing required for an aerospace mount, can often vary from platform to platform; nevertheless, the comprehensive aerospace quality procedures and the vigorous testing regimes, have ensured that ISTEC have successfully qualified mounts on numerous airframes for a variety of global helicopter manufacturers.

EXPERIENCE. INNOVATION.

LIGHTWEIGHT GPMG TRIPOD

The ISTEC 7.62mm L4 Tripod, and the relevant Softmount, have been part of the portfolio of ISTEC products for many years. In 2021 ISTEC launched an upgrade development programme whereby the existing Tripod underwent significant redesign to establish an enhanced variant that would accept different MMG's and LMG's.

The primary aim of the redesign process was to significantly reduce the weight without compromising the operability of the Lightweight Tripod, when compared with the current in-service, steel L4 Tripod.

The not to exceed target weight of 10kg (excluding weapon and ammunition) was met successfully without any degradation in performance. NB: Standard L4 Tripod weighs 13.62kg

The programme included the manufacture of prototype, pre-production and now production units that have been subjected to significant in-house testing, including live firing, with successful results.

The new design includes a lighter frame along with a new ISTEC Softmount designed specifically for the Tripod application.

The Softmount, modelled on in-service ISTEC mounts, will accept the following weapons:

- **7.62mm GPMG, Mag58, M240**
- **7.62mm Minimi**
- **5.56mm Minimi.**

Key features of the new ISTEC Lightweight Tripod include the following:

- **Full 360-degree traverse**
- **Adjustable elevation controls (T&E Mechanism)**
- **Covers 200 mils of traverse and 100 mils of elevation and depression**
- **Adjustable legs**.

The adjustable design of the Tripod provides a line of sight ranging between 330mm to 675mm above ground level when used with a 7.62mm GPMG.

As with all the ISTEC products, the new Lightweight Tripod is supported with complete User manuals (Operator Manual, Maintenance Manual and Illustrated Parts Catalogue) and ongoing ISTEC support throughout the life cycle of the Tripod, with supply of spare parts if required.

HMG
Gun mounts

ISTEC have designed and manufactured various HMG mounts over many years, for applications across Land, Sea and Air domains. The latest is the ISTEC 12.7mm Softmount (20203) which is a compact, modular buffered mount designed to hold the 12.7mm M2HB MG.

The weapon is held securely in the mount via the M2's standard front and rear mounting points and is controlled by the twin handles at the rear of the mount. The handles give the user total control of the mount in azimuth and elevation, plus there is an alternate firing lever attached to the handle on the right side allowing the operator to fire the weapon without removing their hands from the handles. The mount also has an applied safety catch, preventing inadvertent operation of the weapon.

The mount also includes azimuth and elevation locks and stops which can limit movement of the mount in these directions.

The modular design allows for an optional spent case and collection system to be clipped into position if required, as well as a ready round tray.

The mount has been designed using materials and finishes that allows it to be used in either land or naval applications.

The interface for the mount is via the standard G3 cone, but this can be readily replaced with other mounting systems such as NATO 4796 pintles if required.

EXPERIENCE. INNOVATION.

Universal Gun Mount

The widely adopted ISTEC Universal Gun Mount (UGM) is currently utilised on both land and sea-based platforms, where it is attached directly to a traversing ring of the parent vehicle, or to a re-enforced hard point on the side of a vessel.

The UGM is capable of accepting the following range of weapons together with their dedicated softmounts (either ISTEC softmounts, or alternative solutions):

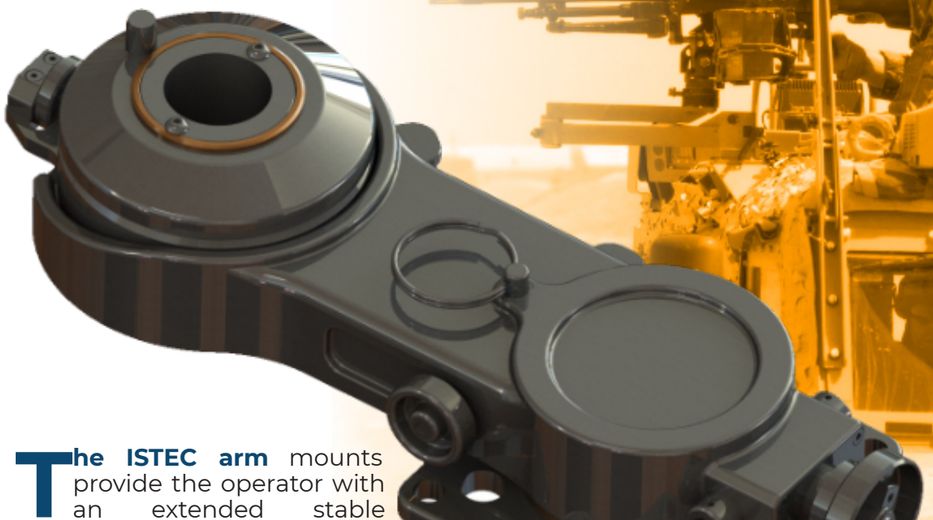
- Light Machine Guns (e.g. Minimi/M249)
- Machine gun (e.g. L7A2 GPMG/FN MAG 58/M240, M60, MG3, PKM)
- Twin L7A2 GPMG Mount
- 12.7mm HMG (e.g. M2HB, L110A2 QCB, M3D)
- 40mm Grenade Machine Gun (e.g. H&K GMG, MK19)

In addition to these weapons, the UGM can be readily fitted with an adaptor to allow mounting of anti-armour weapons and 20mm cannon.

The UGM is designed to provide a solid, backlash-free, firing platform when clamped; fine adjustment being made by means of a fine control Traverse and Elevation mechanism (T&E). This provides exceptional single shot accuracy, coupled with the ability to rapidly engage, or track targets.

The UGM is modular, permitting the attachment of a variety of fitting kits and ancillaries; from frontal armour to folding interface equipment.

ARM
Gun mounts



The ISTEC arm mounts provide the operator with an extended stable platform to fire an LMG/MMG from.

Often fitted to commanders or sentry positions, the swing arms offer an increased range of arcs, to the operator, than is provided from just a fixed pintle.

Each arm is fitted with the appropriate spigot receiver, which is able to mount the correct softmount, normally either the G3 or NATO tapered cone.

For extra arc capability, double swing arms are available.

Lightweight 'bespoke' single/double swing arms can also be designed and supplied.

The swing arm solution offers a capability multiplier for a relatively small cost and minimal footprint. The swing arm needs less than 150mm square real estate on the vehicle to mount.

EXPERIENCE. INNOVATION.

MMG
Gun mounts

As with the ISTEC HMG range of weapon mounts, ISTEC have designed numerous MMG softmounts over the years for applications across Land, Sea and Air domains.

The ISTEC range covers most variants of 7.62mm and 5.56mm weapons.

The ISTEC range of MMG mounts includes compact, capable and easy to use Softmounts, designed to interface with existing pintle sockets or ISTEC designed and supplied interfaces, such as the G3 Cone or NATO Spigot to name but two.

ISTEC have in-service Softmounts designed to interface with the ISTEC Universal Gun Mount (UGM) with built in T&E Mechanism and mounts that include an array of additional (and optional) features to enhance capability, such as:

- Ready Round Stowage (200-400 rounds)
- Spent Case and Clip Collection Systems
- Traverse and Elevation Locking Clamps
- Adjustable Traverse and Elevation Stops
- Mounting points for Frontal Ballistic Shield (steel or composite material)

Other unique designs of ISTEC MMG Softmounts includes the Twin GPMG Mount which is in service on both Land and Naval platforms.

The existing range of ISTEC MMG Softmounts will meet almost all User requirements. However, with the vast engineering knowledge and experience in weapon system design within the ISTEC team, overcoming problems, advising on solutions, and meeting stringent user requirements is the ISTEC speciality.

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PROTECTED
Weapon Stations

The ISTEC ring mounts/PWS product range are weapon mounting systems designed to offer maximum capability with the minimum of user input.

The ISTEC ring mounts allow a single operator to maintain 360-degree capability with the weapon always directly to their front, without the need to stretch or strain on extreme arcs.

The system is based upon a metal ring fixed to the platform roof or support cage. Mounted to this fixed ring is a forged traversing ring, which can offer the operator continuous 360 degrees of uninterrupted traverse in either direction.

The traversing ring provides the mounting platform for a selection of options, usually based upon a base-plate. These include armour panels to defeat threat levels from STANAG 4569 Level 1 up to Level 4, hatches, spare barrel holders, personal weapon holders, spare ammunition box holders, and other operator required ancillaries. The traversing ring or base-plate is also supplied with a weapon mounting interface.

The ISTEC rings are available in a variety of sizes, but normally are restricted to the two most common sizes:

The GVA compliant 1080mm ring and the smaller UK MOD approved 980mm ring (this ring offers the best compromise between size, weight, functionality, and cost).

The weapon interface can be selected for just a single weapon type, such as a 7.62mm MMG, or it can be fitted with the ISTEC Universal Gun Mount, which can take a selection of weapon options from 5.56mm LMG, 7.62mm MMGs, 12.7mm HMG and 40mm GMGs.

As well as designing, manufacturing and supplying complete weapon systems such as the various in-service PWS' and Ringmounts, ISTEC also design sub-systems for military platforms. These include bespoke armoured solutions, steel or composite, such as ingress/egress hatches and shields (either forward facing or designed to give 360deg protection to the User). Many of the sub-systems used on ISTEC weapon stations can also be supplied as standalone sub-systems to third parties (either proven off the shelf designs or adapted accordingly), such as stowage solutions for ammunition, personal weapons and spare barrels; and innovative weapon mounting platforms such as folding 'A' frame assemblies and assisted mechanical handling systems using hydraulics or geared solutions, to offer the weapon system improved elevation and depression angles. ISTEC can also design and supply mounting configurations such as the G3 Cone and NATO Spigots, or other pintle and socket designs.

Whatever the system or sub-system requirement for a weapon platform, ISTEC can provide the solution.

SEA
MG
Gun mounts

The maritime battlespace is one of the harshest environments in which ISTEC equipment operates. Manufactured from marine suitable material and finishes, the range of ISTEC maritime equipment is in use, worldwide, on submarines, capital ships, assault craft, patrol craft, merchant navy craft, oil rigs and hovercraft.

ISTEC weapon mounts provide a stable platform to support operators crew served weapon.

ISTEC's main focus of weapon mount capability is buffered softmounts, into which the weapon would be fitted . Recoil and Runout mechanisms within the softmounts, buffer the weapon during firing, reducing the max peak recoil forces by up to 40%, whilst still maintaining the full functionality of the weapon.

Softmounts interface with the parent platform via a spigot. ISTEC offer a range of spigots, including the G3 tapered spigot, the NATO 4796 tapered spigot, the US standard parallel spigot and minigun gun spigot.

In general the receiver for the softmounts mounts directly onto the platform, a swing arm, or ring mount system and provides crucial safety arc stops needed on maritime platforms.

The ISTEC Universal Gun Mount (UGM) is the largest of the softmount receivers supplied worldwide to the military: offering outstanding capability to the operator. The UGM can be fitted with a front shield and also fitted to folding bulwark mechanisms to bring the weapon system 'in board' when required.

EXPERIENCE. INNOVATION.

Weapon Stations

The ISTEC maritime ring mounts are a weapon mounting system designed to offer maximum capability with the minimum of user input.

The ISTEC ring mounts allow a single operator to maintain up to 360-degree capability with the weapon always directly to their front, without the need to stretch or strain on extreme arcs.

The system is based upon a metal ring fixed to the platform. Mounted to this fixed ring is a forged traversing ring, which can offer the operator continuous 360 degrees of uninterrupted traverse in either direction unless physical arc stops are required.

The traversing ring provides the mounting platform for a selection of options, usually based upon a baseplate. These include armour panels to defeat threat levels from STANAG 4569 Level 1 up to Level 4, hatches, spare barrel holders, personal weapon holders, spare ammunition box holders and other operator required ancillaries. The traversing ring or baseplate is also supplied with a weapon mounting interface.

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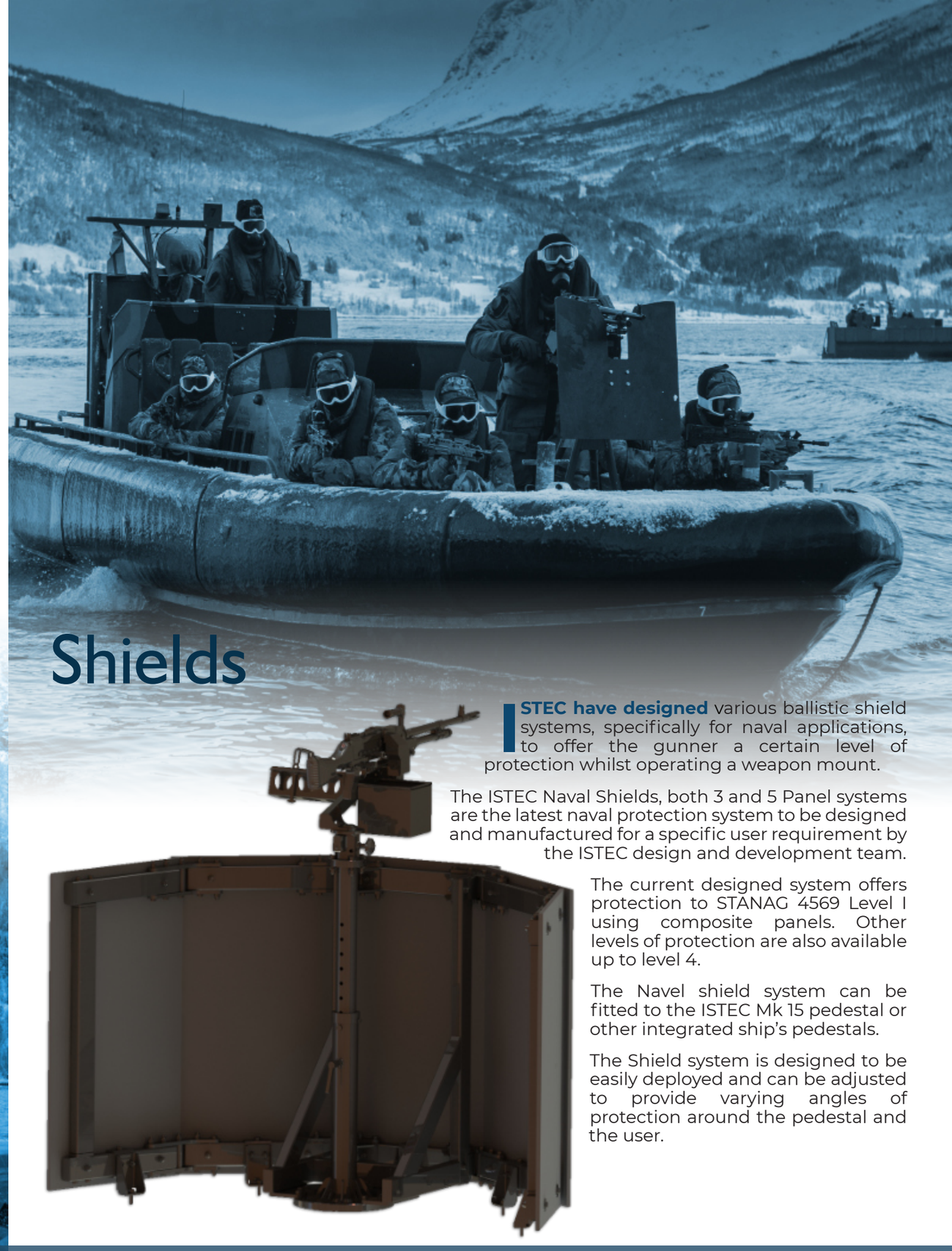

Shields

ISTEC have designed various ballistic shield systems, specifically for naval applications, to offer the gunner a certain level of protection whilst operating a weapon mount.

The ISTEC Naval Shields, both 3 and 5 Panel systems are the latest naval protection system to be designed and manufactured for a specific user requirement by the ISTEC design and development team.

The current designed system offers protection to STANAG 4569 Level I using composite panels. Other levels of protection are also available up to level 4.

The Navel shield system can be fitted to the ISTEC Mk 15 pedestal or other integrated ship's pedestals.

The Shield system is designed to be easily deployed and can be adjusted to provide varying angles of protection around the pedestal and the user.

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AIR

M3D
Gun mounts

The ISTEC aerospace weapon mounts provide a stable platform to support operators crew served weapon.

All ISTEC 12.7mm helicopter mounts are designed and built bespoke for each platform type and conform and qualify to all aviation standards. The ISTEC 12.7mm helicopter softmounts are specifically designed to exacting standards and will accept the 12.7mm M3D MG.

The modular design of the mount assembly enables it to be deployed and modified to suit varying roles. The mount system incorporates a proven ISTEC 12.7mm softmount mechanisms.

The softmount can be detached quickly and without tools, and mounted on any other G3 cone mount, such as the UGM: providing capability for the helicopter operating in both Land and Maritime environments.

MMG
Gun mounts

Each ISTEC 7.62mm helicopter mount is designed and built bespoke for each platform type and conforms and is qualified to all aviation standards. The ISTEC 7.62mm helicopter softmounts are specifically designed for use as crew door swing arms on a variety of helicopters and allow fitting of the 7.62mm M60, Mag58 GPMG and 7.62mm PKM.

ISTEC 7.62mm Helicopter Mounts are fully qualified 'air worthy', in service mounts.

The modular design of the mount assembly enables it to be deployed and modified to suit varying roles. The mount system incorporates the proven ISTEC GPMG softmount mechanisms.

The softmount can be detached quickly and without tools, and mounted on any other G3 cone mount, such as the UGM: providing capability for the helicopter operating in both Land and Maritime environments.

The swing arm travel locks are set for the individual helicopter and position, preventing customer desired arcs being exceeded. Ammo box holders are standard.

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RANGE DRUMS
HMG & GMG

The L8A1 .50in range drum has ballistic optimisation for the current range of in-service .50in. ammunition.

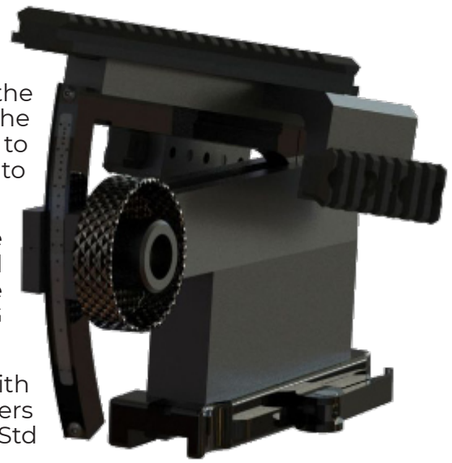
The range drum is graduated from 500m to 2200m in 100m increments. It features a Gaseous Tritium Light Source (GTLS) for illumination of the range scale under conditions of low light level.

The range drum is fitted with a quick release clamp that allows fitting to a Mil Std 1913 Picatinny rail.

The rail for attachments of the optical sight and other electro/optical ancillaries is the Mil Std 1913 Picatinny type.

It features a rotary locking device fitted to the range adjusting drum, which, when applied, prevents inadvertent rotation.

There is a high degree of commonality between the various models and with a full range of sub-assemblies and component parts available if required to carry out a repair.



The 40mm L9A1 range drum is optimised for the various natures of 40mm munitions currently available. The sight mounting rail is tilted slightly to the right from the horizontal, to compensate for drift caused by the spin of the projectile. The range scale is graduated from 0 to 2000 m and is fitted with a GTLS on the range and zero lines to aid setting the range under low light levels.

The range drum is fitted with a quick release (QR) female dovetail mounting bracket, commonly referred to as a rail grabber; which allows rapid fitment and adjustment to the Picatinny pattern mounting rail on the bridge of the GMG soft mount.

The range drum is fitted with a top mounted sight rail, with two side mounted rails for auxiliary equipment such as lasers and range finding equipment. All three rails conform to Mil Std 1913.

The range adjusting drum can be locked in any elevation, providing exact range targeting and preventing inadvertent movement once the range is selected.

SIGHT
Mounts

The L12A1 flipover sight bracket, with its double Picatinny pattern rails, is designed as a direct replacement for the existing IR sight mounting bracket secured to the LH rear side of the GPMG body.

The design of the sight bracket positions the optical axis of the sight directly above the bore, as well as a secondary equipment such as a laser. When loading / unloading or carrying out weapon IA drills the sight can be tilted to the left, allowing the top cover to be opened. The Picatinny pattern mounting rail allows fitting of any optical sight or night vision sights equipment with a Mil Std 1913 interface.

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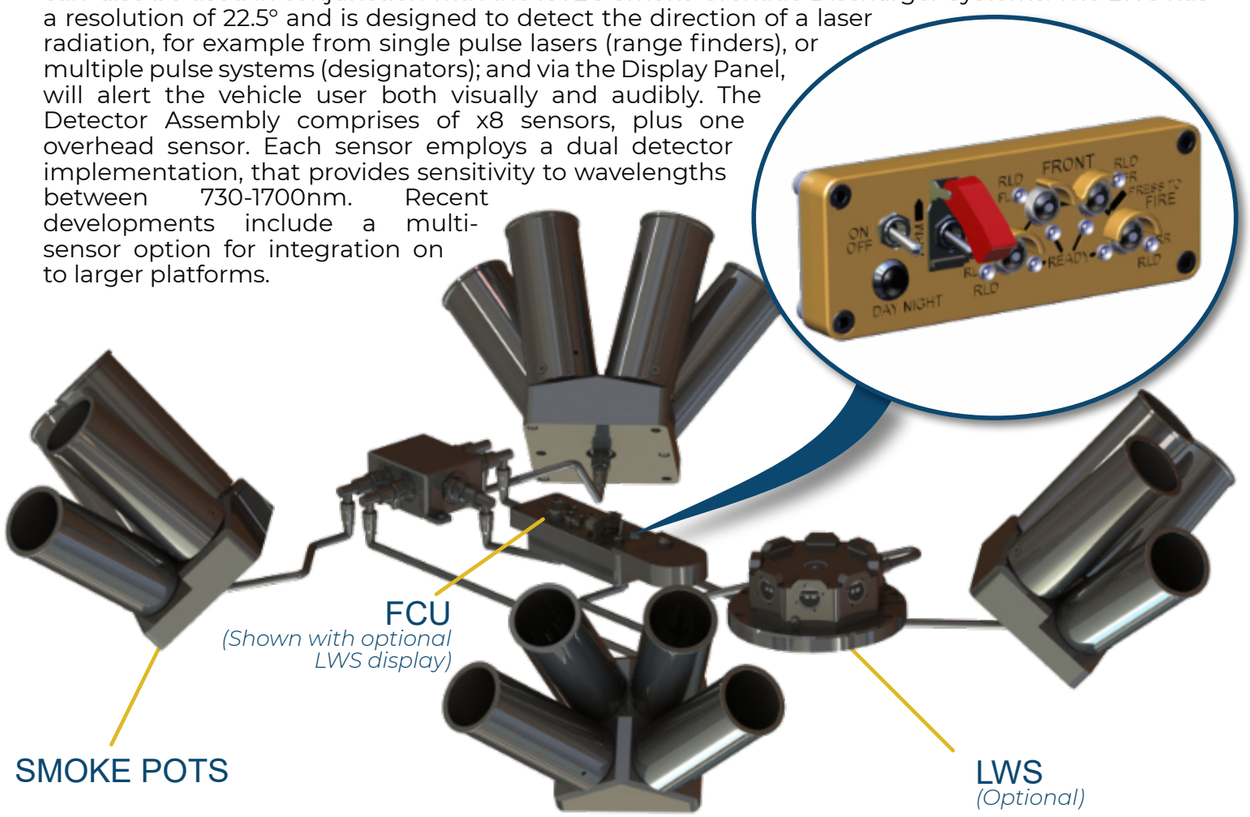
Smoke Grenade Discharger & Local Situational Awareness System

The ISTEC qualified and in-service 66mm, and 76mm Systems have both been designed and developed in-house. A typical 66mm System consists of banks of Smoke Dischargers (usually two or four banks), Junction Box (if required), Fire Control Unit (FCU) and all interconnecting harnesses. The 76mm system consists of individual dischargers, that can be mounted on a platform, which is then fixed to the vehicle. The banks of dischargers can be configured to suit customer requirements, e.g., two banks of two tubes; four banks of three tubes; four banks of four tubes etc. The FCU is common across both 66mm and 76mm systems and is fully sealed and EMC protected. The FCU has a series of green LED's which denote when each discharger tube is armed and a series of yellow LED's that indicate when the discharger tubes require reloading. It also has a 'blackout' mode for covert operations. As with all the ISTEC products, the 66mm and 76mm Discharger Systems are supported with complete User manuals (Operator Manual, Maintenance Manual and Illustrated Parts Catalogue) and ongoing ISTEC support throughout the life cycle of the systems, with supply of spare parts if required. ISTEC can also supply ancillary items such as Barrel Cleaning Brushes, Circuit Testers and Grenade Stowage Boxes. NB: ISTEC 66mm and 76mm systems are designed to fire current in-service grenades.

The versatile ISTEC Laser Warning System (LWS) is designed as both a standalone system, which can also be used in conjunction with the ISTEC Smoke Grenade Discharger Systems. The LWS has a resolution of 22.5° and is designed to detect the direction of a laser radiation, for example from single pulse lasers (range finders), or multiple pulse systems (designators); and via the Display Panel, will alert the vehicle user both visually and audibly. The Detector Assembly comprises of x8 sensors, plus one overhead sensor. Each sensor employs a dual detector implementation, that provides sensitivity to wavelengths between 730-1700nm. Recent developments include a multi-sensor option for integration on to larger platforms.



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Customer Support

The dynamic approach incorporated by ISTEC starts with strong customer liaison to fully understand a customer's requirements. Our customer support team is ex-military and has a strong understanding of requirements and capabilities.

Links forged between ISTEC and the customer at this early stage is strengthened throughout the programme; through delivery. Customers have direct access to a dedicated representative to help support their requirement.

ISTEC technicians deploy globally, into diverse locations; in order to assist its customer base with varied tasks ranging from equipment installation, embodying modifications, to providing advice and training.

It is ISTEC policy that Integrated Logistic Support is applied to all product development and supply. ISTEC use a disciplined approach that influences the product design and develops a sustainable support solution, to reduce Cost Of Ownership and maintenance burden, whilst optimising supportability.

ISTEC use Supportability Engineering Management tools to produce a product that not only delivers the required capability, but can also be supported and maintained at various levels.

Reliability Centred Maintenance is used to produce equipment and maintenance regimes, which reduce down time, erroneous inspections and ultimately support costs.

Ease of Maintenance Assessments are employed to establish the most efficient engineering support regime.

Training Needs Analysis is conducted to ensure the equipment can be used and maintained, on or off the battlefield, with minimum but effective training, and ISTEC can offer training courses and supporting publications for Users and Maintainers.

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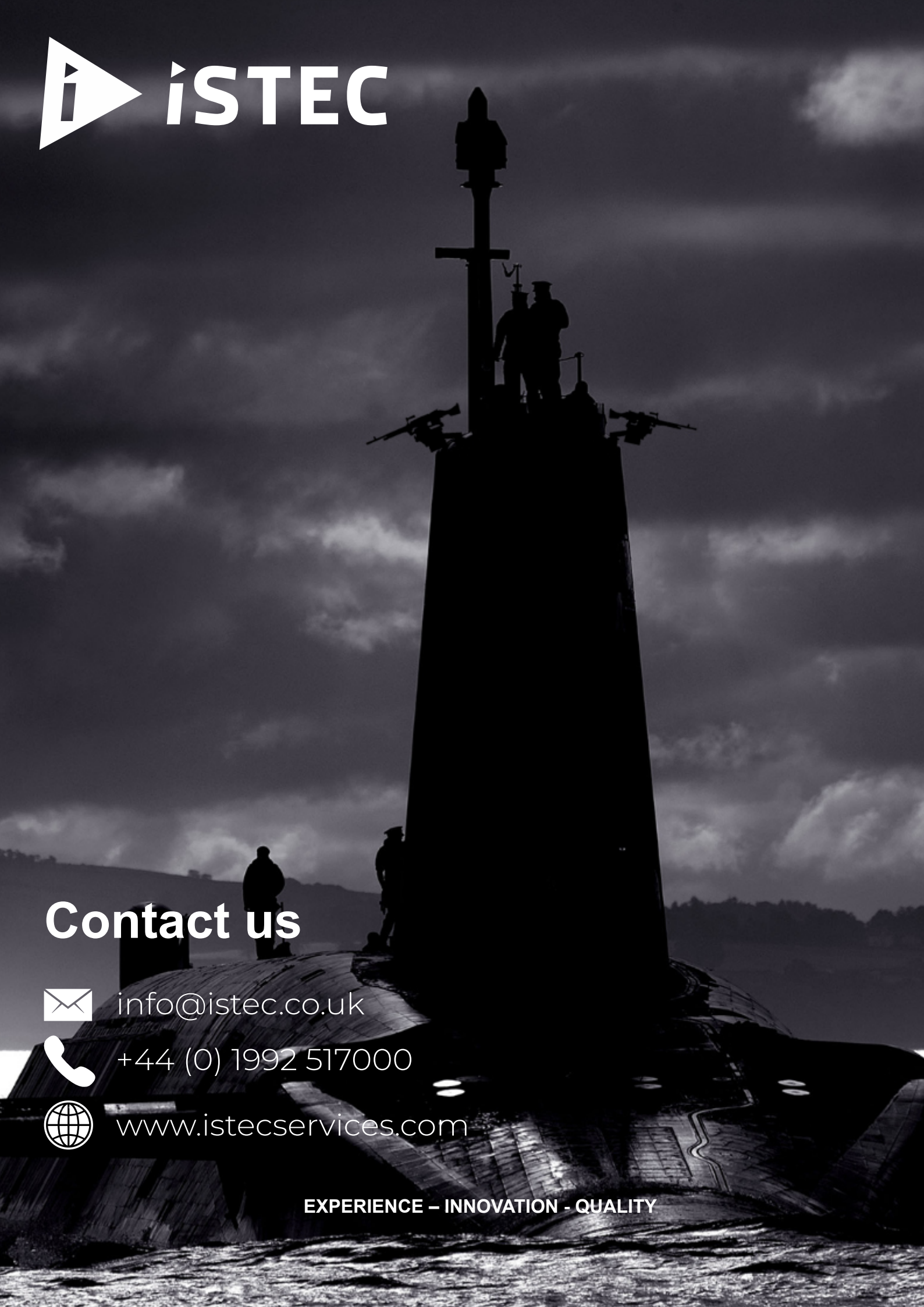

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