

MS Instruments PLC

**LEADING SUPPLIERS OF LIVE-FIRE TRAINING SYSTEMS
BALLISTIC MEASURING INSTRUMENTATION
AND COVERT PROTECTION SYSTEMS**

www.msinstruments.co.uk

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MS Instruments PLC. A leading innovator in the design and manufacture of ballistic measurement instrumentation and Live-Fire training equipment for ground and air training. Working with the expertise of Wiltshire Ballistic Services (WBS), MS Instruments provides proven, rugged and well-built products for most internal and external applications. Our products are used by a number of manufacturing companies, governments and Armed Forces worldwide and once combined with our leading edge software, this instrumentation delivers flexible and individually tailored solutions. Our equipment is designed to be of the highest accuracy and, because our equipment is in constant use for trials at WBS, we are able to continuously test and develop our products. MS Instruments strives to be the world's leading expert on ballistic instrumentation. As a result, we have been approached to work on a number of specialised projects, a recent development being our covert vehicle protection system (NIMBUS), and asked for advice on large projects.

Quality

In this specialist field, MS Instruments are one of the major suppliers in the world. Maintaining high standards not only by producing, designing and manufacturing high quality equipment and systems, but also by providing on-going support for a minimum of 10 years after the equipment is installed. When MS Instruments warranty runs out your support doesn't. MS Instruments place a great emphasis on the quality of their systems; they are rugged, well-built and fully equipped to give reliable results in extreme conditions. The equipment and software are designed to make the recording and interpretation of the data convenient, fast and accurate.

The life cycle cost of MS Instruments equipment is extremely low. Over a 10 year period, typical maintenance and repair costs would be less than 20% of the initial cost of the system, meaning that not only are MS Instruments systems economical and reliable, but they are also an excellent investment.

In 1986, MS Instruments were approved by UK MoD(QA) to the NATO AQAP1 Quality Assurance standard for both hardware and software. Since 1993, MS Instruments have been approved to ISO 9001.

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Enhances trainee motivation and training standards



Records hit and missed shots instantaneously

Complete wireless range control

LIVE-FIRE GROUND TRAINING

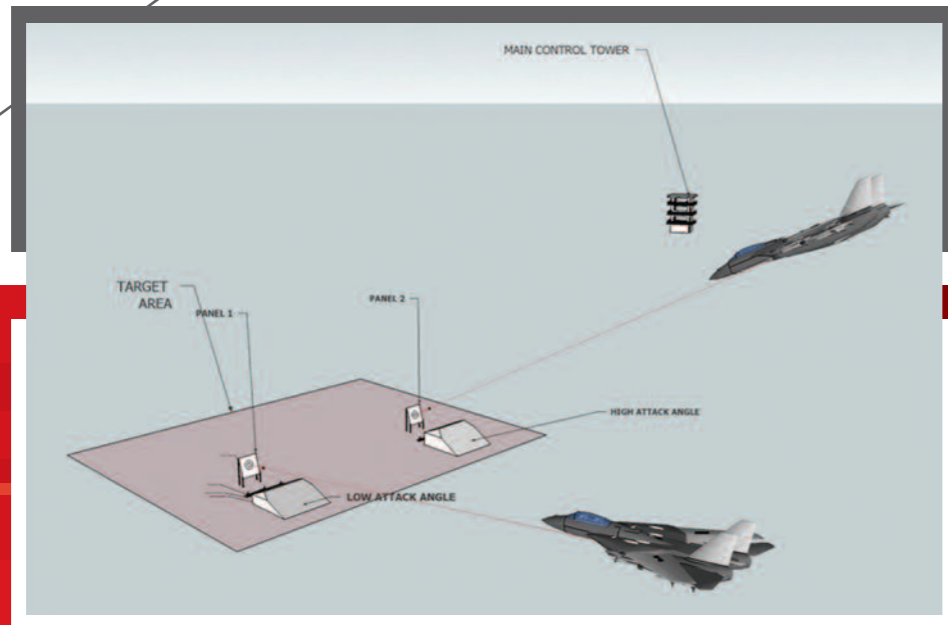
The MS Instruments Automatic Marking System (AMS) or Location of Miss And Hit (LOMAH) is designed for use at all stages and levels of training.

Live-fire training is the most effective way of preparing the soldier or shooter for the field. Whilst there are some benefits to simulation in early training, it is not truly representative of the in-theatre situation. MS Instruments' equipment is rugged, reliable, highly accurate, easy to use and configure, and can run different training combinations simultaneously. The system produces instantaneous results wirelessly to the firer or instructor on a firing point monitor, enabling rapid analysis and improvement of performance. This information is also available at a central range controller for analysis by the Range Officer or stored for future use. Our systems are in service throughout the world in a variety of different environments. The system uses acoustic scoring technology, meaning there are no false recordings from stones and debris.

Live-fire training targets can be made as flexible and realistic as you need them to be, and can be used both indoors and out. They can be set up to "present" themselves to the trainee in pop-up mode, turn or swivel mode, or both and can do this randomly or under the range controller's command. They can be illuminated and heated to make them IR/NVG compatible. As well as being configured for multi lane shooting ranges, which the Company is able to equip fully, targets can be configured to work together to provide a full shoothouse style capability. There is also a portable version of this versatile system for in the field training and weapon zeroing.

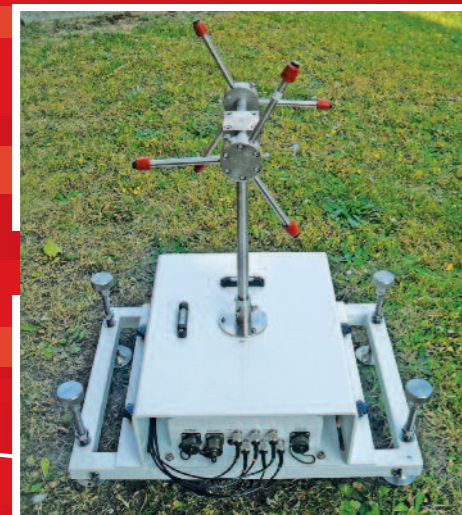
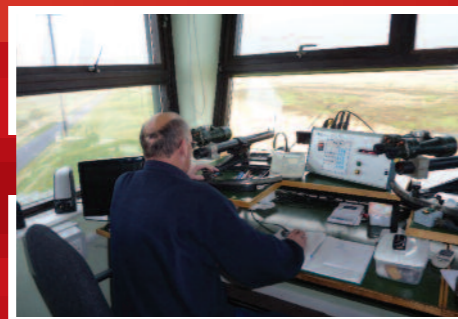
Larger scale versions are available for tank gunnery training using heavy-duty targets and lifters and these can also be made to pop-up and down, fall when hit and move on rails.





AIR-TO-GROUND STRAFE AND BOMB-SCORING SYSTEMS

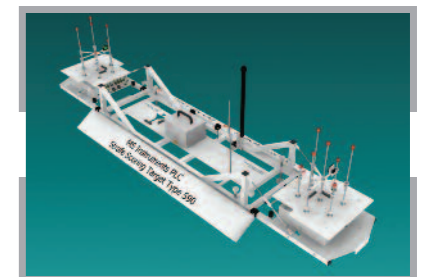
MS Instruments' Air-to-Ground Strafe and Bomb-Scoring systems have been designed for rapidly training and assessing the performance of a pilot in air-to-ground gunnery and bombing and have been in service with the Royal Air Force for over 15 years.



- Automatic Strafe Scoring
- Semi-automatic Bomb-Scoring
- Large detection area and instantaneous results
- Multiple pilots training at one time

The Strafe system is completely automatic, allowing multiple pilots to be in the air at once while the Windows®-based software can record details of the pilot, aircraft call sign, aircraft type, stores and attack profile for analysis / de-brief upon landing. The system produces instantaneous results back to the control tower for relay to the pilots or for later analysis. The targets are acoustic, meaning that only supersonic projectiles will be recorded, reducing errors from rubble or stones.

Both systems are designed to be accurate and to provide real-to-life environments for training pilots. By training outside, the pilots are subjected to rapidly occurring meteorological changes - e.g. the distracting sudden glow of the sun, stresses on the plane due to cross winds and tail winds etc, as well as sharing airspace with other fast moving aircraft. These are factors that the pilots may not be sufficiently aware of from just simulator training.



The Bomb-Scoring system consists of two sighting quadrants that are used to triangulate a bomb falling on or near a target. This system is semi-automatic and requires the operator to log the angular measurement, which is sent via UHF radio link to the range control tower. The software displays the bomb position on screen in graphical form ready for relaying to the pilot or for later analysis.



Non-Lethal and covert

No impact to function of vehicle

Simple to deploy with safety firing system

Worldwide tracking system

Retro fits to any vehicle

NIMBUS NON-LETHAL VEHICLE PROTECTION SYSTEM

Nimbus comprises a series of covertly-fitted pyrotechnic devices that are fired from within the vehicle. The system is designed to **DISTRACT, DISORIENTATE** and **DEPRIVE**

The system uses smoke, sound and airburst to distract and disorientate attackers while giving the edge back to the inhabitants of the vehicle. The Nimbus Non-Lethal Deterrent (NLD) system provides an effective countermeasure by creating a dense smoke screen around the vehicle, while the sound and flash disorientates the attacker(s), scattering any shots being fired.

Nimbus is completely controlled from within the vehicle and the operator has the option to deploy a single unit, a bank of units (left or right), the rear air units or the entire system all at once. The control panel can be dimmed for use at night and there is the option of a remote firing unit. Before departing the system can be configured for the environment in which it will be used. Once units have been deployed the system automatically arms the remaining units and constantly self-checks while in use.

The system incorporates a tracker system that provides a warning message back at base or on a mobile phone device once Nimbus has been deployed. It also provides location data of the vehicle so action can be taken.

This system is designed to be versatile so it can be used for a variety of purposes including VIP protection, transporting goods, compound protection, training, riot prevention and for the Armed Forces. The system can be fitted to any vehicle in a matter of hours.

WHERE DID IT COME FROM?

In June 2004, a VIP was travelling in the Baghdad area of Iraq, accompanied by his armed escort. Both vehicles were 'up-armoured' to the 'B6' standard. Up-armouring means that these vehicles look like normal vehicles, but the windows are much thicker than usual – perhaps 2-3cm thick depending on the specific design – and the doors are reinforced by armoured steel or specialised composite materials. They may also have reinforced floors, roofs and engine compartments, although this is often not the case.

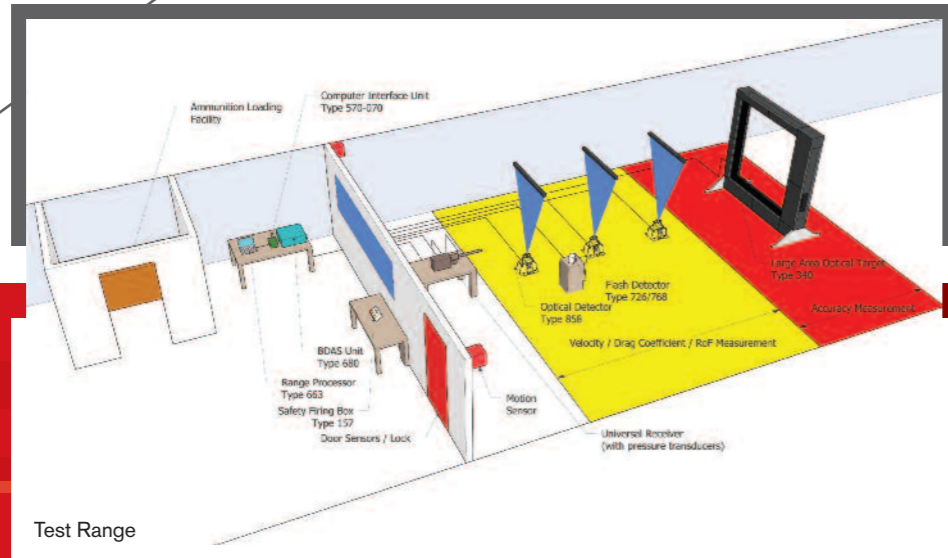
B6 can be interpreted in a number of ways, but the idea is that it is protected against attack from sniper rifles and Light Machine Guns. It is often assumed that this means the vehicle is 'bullet-proof'. However what the standard defines is that in a strictly controlled test, a triangular pattern of 3 shots are fired no more than 120mm apart. No bullets must penetrate and no debris must emerge from the back of the test sample.

On that fateful day, 3 gunmen attacked the escort vehicle, which was travelling at 80kph. They fired over 200 rounds at the vehicle, and at least 100 of the bullets hit. The gunmen didn't fire in the prescribed triangular pattern, and the rear windscreen – which was not armoured – was destroyed instantly. The inner rear-screen, which was armoured, sustained over 25 hits. 5 penetrated and 2 ended up in the shoulder and arm of the Vehicle Commander. Of the other hits, one bullet penetrated the driver's window, hitting him in the back of the head. Mercifully both personnel survived.



Nimbus Firing Box

From our ballistic knowledge and the account above we know that no matter what the level of armouring, at some stage it will be breached as no vehicle can be bullet proof. Nimbus aims to counteract an attack by dispersing shots, disorientating attackers and to remove the target so the passengers have time to react or escape.



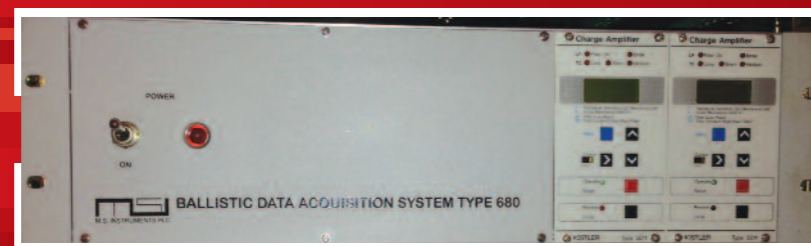
Test Range

BALLISTIC INSTRUMENTATION AND RANGE DESIGN

MS Instruments designs and manufacture a comprehensive range of ballistic instrumentation for highly accurate data recording. Acoustic and optical target systems are a precise, cost and time effective way of measuring weapon and ammunition accuracy.



PVMS - Optical Detector & Triple Channel Remote Timer Unit

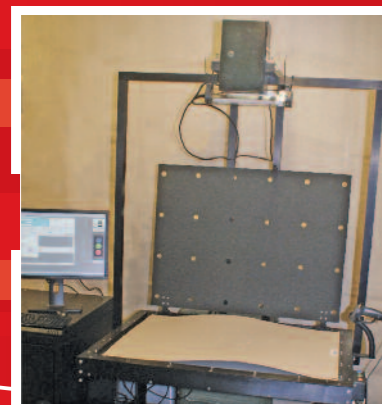


Ballistic Data Acquisition System

Measure rate of fire, velocity and internal pressure

Accurate up to 0.02%, rugged and portable

Wide range of solutions



Strawboard Imager

Our comprehensive range of instrumentation comprises intelligent units that can be used to measure all the ballistic parameters of subsonic and supersonic projectiles. These sensors can be connected either by cable or wirelessly to a single Range Processor, be it a standard PC or laptop. By using GPS to locate every event, in both time and space, the information recorded is extremely accurate.

The company provides its own BallisticsDB software giving full control and diagnostics of the connected equipment as well as data warehousing and statistical analysis capabilities. The system is Windows®-based and the data is in Access format but may be exported to Microsoft® Excel for further analysis.

Using optical and/or acoustic detectors, we can measure velocity, rate of fire and general performance of both the ammunition and weapons from small arms to cannon ammunition. Our Projectile Velocity Measuring System (PVMS) can measure velocities extremely accurately to within 0.02% in bright or low light conditions. MS Instruments manufactures triggering systems based on acoustic and flash detection technologies which provide accurate

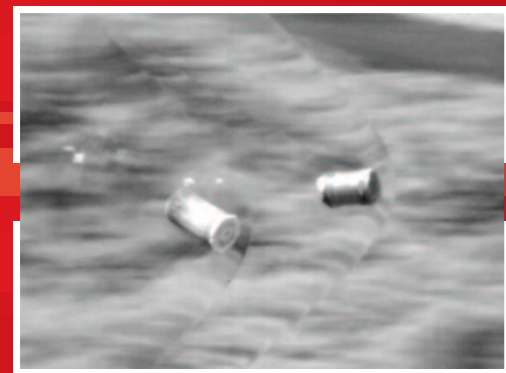
initiation of other systems for recording purposes.

MS Instruments can provide equipment to create an entire test range. As well as targets and software, we can supply weapon mounts, universal receivers and help source specialist ammunition for specific tests. We can design indoor and outdoor ranges for all tests on weapons, ammunition and ballistic materials.

MS Instruments is always developing new systems to expedite trials activities: the Company's new Strawboard Imager is designed to reduce the time taken for fragmentation analysis. To do this, a warhead is detonated surrounded by large pieces of strawboard or card stacked up to 40 pieces deep. Once detonated the resulting fragment holes in each piece of card are analysed to measure factors such as penetration, size and angular dispersion etc. This analysis is currently done by hand and a typical trial would take 3-6 months to analyse. With the Strawboard Imager the analysis is done in a matter of hours. The imager system has been supplied in various forms to UK Government research establishments as well as overseas customers.



Meteorological Station



Product development and testing

Reduces time and cost of trials

Better than 0.1° tracking accuracy over 90° scan

Mid flight update for impact analysis

AUTOMATED FLIGHT FOLLOWER

For a more detailed analysis of the flight of a projectile, MS Instruments has developed a fully Automated Flight Follower system (AFF).

The Flight Follower was developed to meet the high speed imaging needs of modern ammunition designers and manufacturers. The system allows the user to see quickly any flaws within the ammunition that would otherwise be invisible, saving time and further costly trials. The images produced are so detailed that you can actually see the supersonic shock wave being created by the projectile.

The system uses a high speed camera and computer controlled rotating mirror. The mirror is programmed to rotate at the correct speed such that the camera will follow the projectile in flight. Typically, the system will follow a projectile for 100m or more with better than 0.1% accuracy over a 90 degree scan, although as the scan distance is twice the stand-off distance, it is possible to visualise the projectile over many hundreds of metres.

This latest, all new version of the Flight Follower is fully automated, simplifying system operation, without limiting flexibility. It offers a much improved performance over previous systems, whilst eliminating the need for calibration. It can be controlled and adjusted remotely, considerably simplifying the analysis of firings at multiple angles.

The Automated Flight Follower has several modes of operation which are software selected, depending upon the individual conditions of the test. It can record horizontal and elevated firings, will track all medium and large calibre projectiles as well as other objects such as rockets, base bleed and rocket assisted projectiles and sledge track tests etc. The system accommodates most high speed video systems, meaning the customer can opt for their own choice of camera. In addition, the dedicated analysis software is able to record velocity, drag correction, trigger delay and is also able to calculate and show even minor yaw and pitch variations.



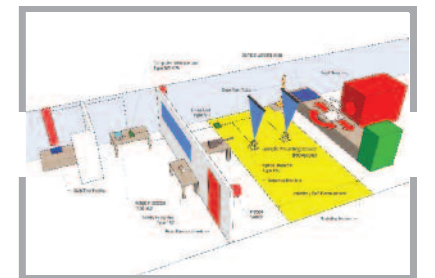


BALLISTIC TESTING

Wiltshire Ballistic Services

Wiltshire Ballistic Services Ltd (WBS) is a dedicated ballistic test facility and indoor trials and demonstration range that has been undertaking ballistic trials for nearly 30 years. It offers secure, indoor firing ranges in Devizes, Wiltshire, as well as ballistic testing on outdoor ranges. WBS specialises in the testing of bullet and projectile resistant materials, including stab testing.

We can provide a bespoke service to supply all ballistic testing equipment including weapons, universal mounts, sample holders and instrumentation, for all natures of ammunition from 9mm to 40mm. We can test all samples, vehicles and building materials against small arms, cannon, bomb and IED attack. We are able to provide an unbiased verification and validation assessment of weapons, ammunition and materials for supply to the MoD, Police and other services. The company is also approved to handle classified material.



Independent from any weapon or armour manufacturers, quality approved to ISO 9001, certified to ISO 17025 and MOD Approved, WBS offers a full range of testing to international standards. Accessible whatever the weather, WBS offers test facilities unparalleled in the UK, using the most up to date and sophisticated instrumentation available. It is operated by a service-oriented team who have extensive practical experience in the field. WBS's independence guarantees impartial results and confidentiality of its client's products and concepts.

WBS has its own on-site conference room with network, modem and presentation facilities as well as kitchen amenities. We also offer convenient, no hassle parking next to the range, with the Restaurants and Hotels of Devizes within easy walking distance.

WBS is a wholly owned subsidiary of MS Instruments PLC, and the synergy between the two companies ensures that the service and facilities offered in the future will continue to include the latest and best technology.

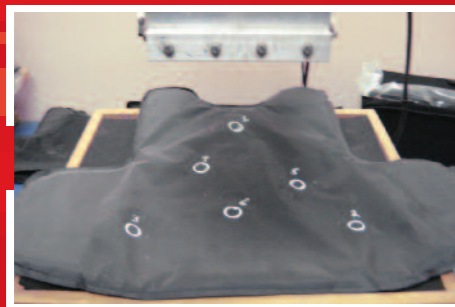
With the guidance and proactive assistance of our team, you can have complete confidence in dealing with a true centre of excellence, which represents the best opportunity to develop a product for your own market or customer – and quickly.

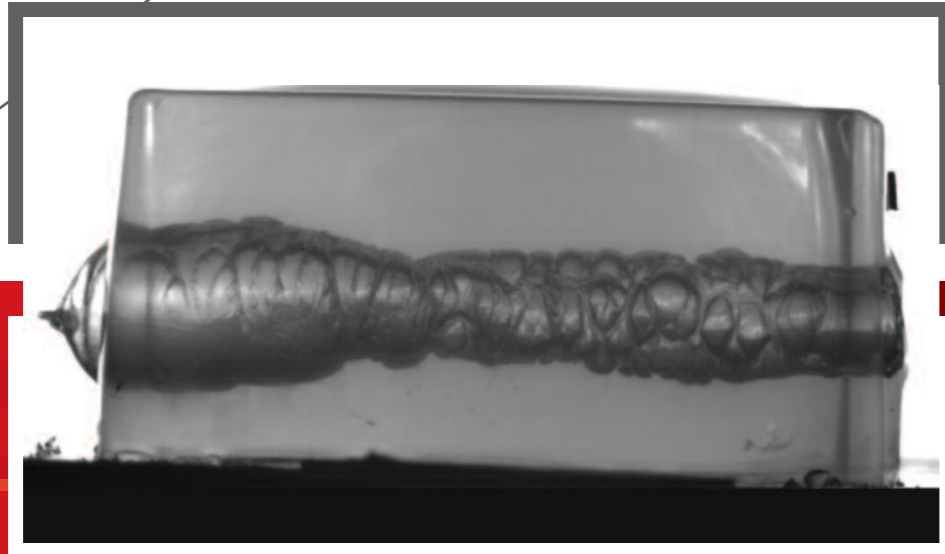
Ammunition, Weapons and Ballistic Materials testing

Test to National and International Standards

Complete customer confidentiality

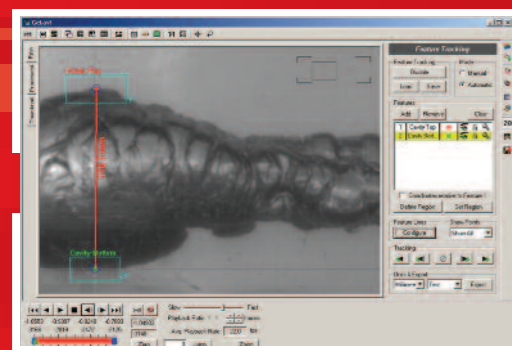
Design and product development



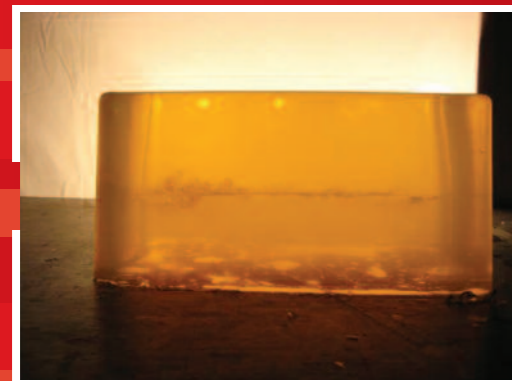


FORENSIC TESTING

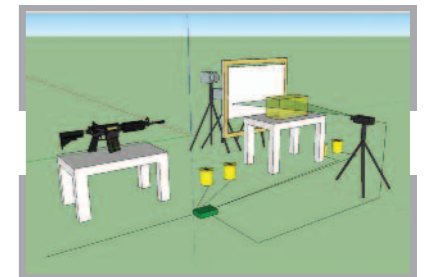
MS Instruments equipment can be used for forensic investigations to identify weapon or ammunition performance in forensic cases and to train officers in recognising shot patterns.



Ballistic gel analysis
 Officer weapons training and familiarisation
 Measurements for weapon identification
 Instrumentation for understanding the characterisation of fragment size, energy and distribution



We provide equipment for ballistic gel analysis for both evidence gathering purposes and the study and demonstration of the effects of a projectile on body tissue. We also supply the software to deliver accurate analytical results, and the necessary equipment to make up ballistic gel to exacting standards. Our Projectile Velocity Measurement Systems (PVMS) and Strawboard Imager can assist in weapon and ammunition identification and for gathering information on characterisation of fragment size, energy and distribution. Information gathered can help determine lethality of a projectile and provide crucial evidence in a case.



All of our Range Processors run the Windows® operating system, allowing simple data exchange and providing data in Excel™/Access file formats. Having the standard Windows® user-interface ensures rapid familiarity with the software and reduces the need for extensive training on the equipment, although a full training course on the gel analysis principles is available.

Our forensic equipment is in-service with police forces and forensic laboratories throughout the UK.

The Ballistic Tool Kit Mission Statement

The Ballistic Tool Kit's (BTK) mission is to provide specialist equipment, training and support to Security, Military and Law Enforcement customers anywhere in the world.

BTK was formed in 2006 by a number of small and medium-sized UK companies in the defence sector to enable these companies to reach a growing export market. The primary purpose is to pool their skills and resources to offer unique, combined solutions to potential customers in the increasing Law Enforcement, Security and Military market place.

The diversity of membership enables BTK to supply small arms, specialist weapon systems, training and targeting systems, optical equipment, specialist lubricants, body armour, personal protection, communications, protective barriers, range and compound design and construction, precision engineering and other specialised developments.

As members we are constantly interacting and looking for new ways to maximise our potential and utilise each other's products to ensure customer needs are satisfied. With such a diversity of expertise, BTK members are now also providing solutions for Disaster relief and Humanitarian Aid.

Individual companies are small enabling them to react and adapt quickly to change, keep up with technology and customer requirements. Collectively the companies within the BTK come together to provide total flexible solutions that harness BTK's skills to meet individual customer requirements without compromise.

The success of the BTK has shown that collectively small UK companies can, and do, have the skill and marketing potential to punch as high - if not higher - than larger companies in the highly competitive world of defence sales. Customer satisfaction is our watchword. Our individual and collective corporate identities and our increasing reputation are something of which we are enormously proud.

Once the requirement has been clearly identified then the key team members are selected. The BTK members work through one prime contractor within their group to ensure maximum convenience for the customer, no matter how complex that contract is. This set-up is important for the customer as they have one single point of contact and one single contract for all their BTK requirements.

- Group turnover in excess of £150m
- Personnel 200 - 250
- BTK business in excess of £30m
- Average enquiry-to-order time < 12 months
- Average delivery time < 3 months

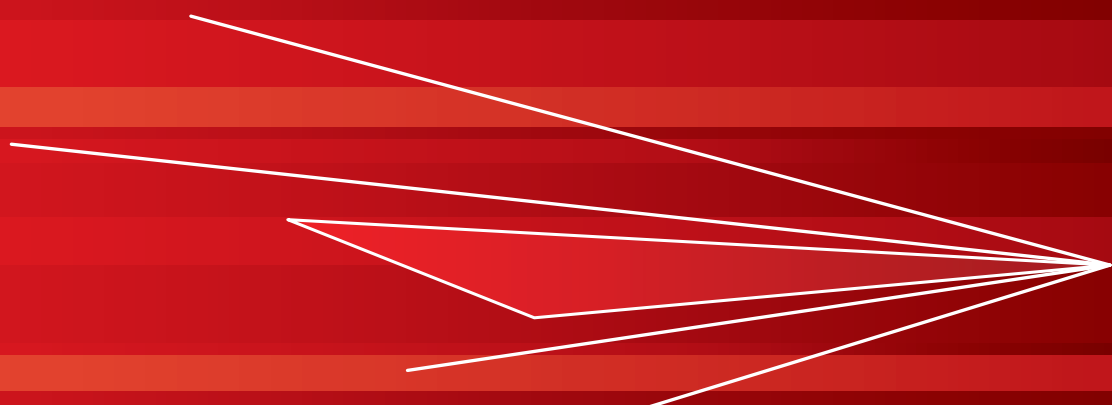
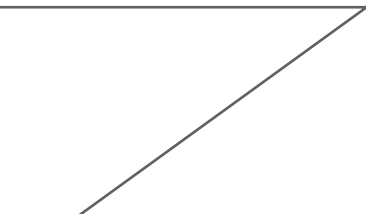
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