

MS Instruments

**Leading suppliers of live-fire training systems,
ballistic measuring instrumentation and
Ballistic Panel training systems**

www.msinstruments.co.uk

MS Instruments Ltd. A leading innovator in the design and manufacture of ballistic measurement instrumentation and Live-Fire training equipment for ground and air training.

MS Instruments Ltd. 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, for example our covert vehicle protection system (NIMBUS), and also 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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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.

Enhances trainee motivation and training standards



Complete wireless range control



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.

- 1 Pop-up Target
- 2 Wireless Systems Controlled by the Range Officer
- 3 Rail Moving Target
- 4 MS Instruments' Equipment
- 5 Larger Target Example

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.

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Records hit and missed shots instantaneously

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Live-Fire Ground Training

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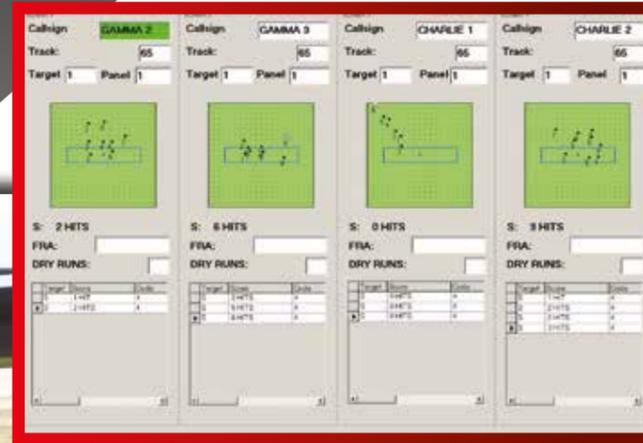


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Air-To-Ground Strafe And Bomb-Scoring Systems

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 20 years.

Automatic Strafe Scoring



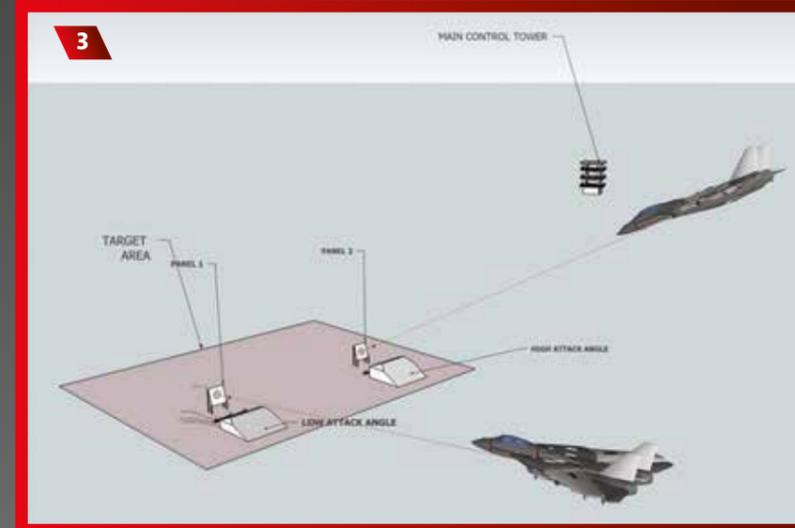
The Strafe system is completely automatic, allowing multiple pilots to be in the air at once while the Windows®-based software can record details of the pilot, aircraft call sign, aircraft type, stores and attack profile for analysis / de-brief upon landing. The system produces instantaneous results 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.

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.

Semi-automatic Bomb-Scoring

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.

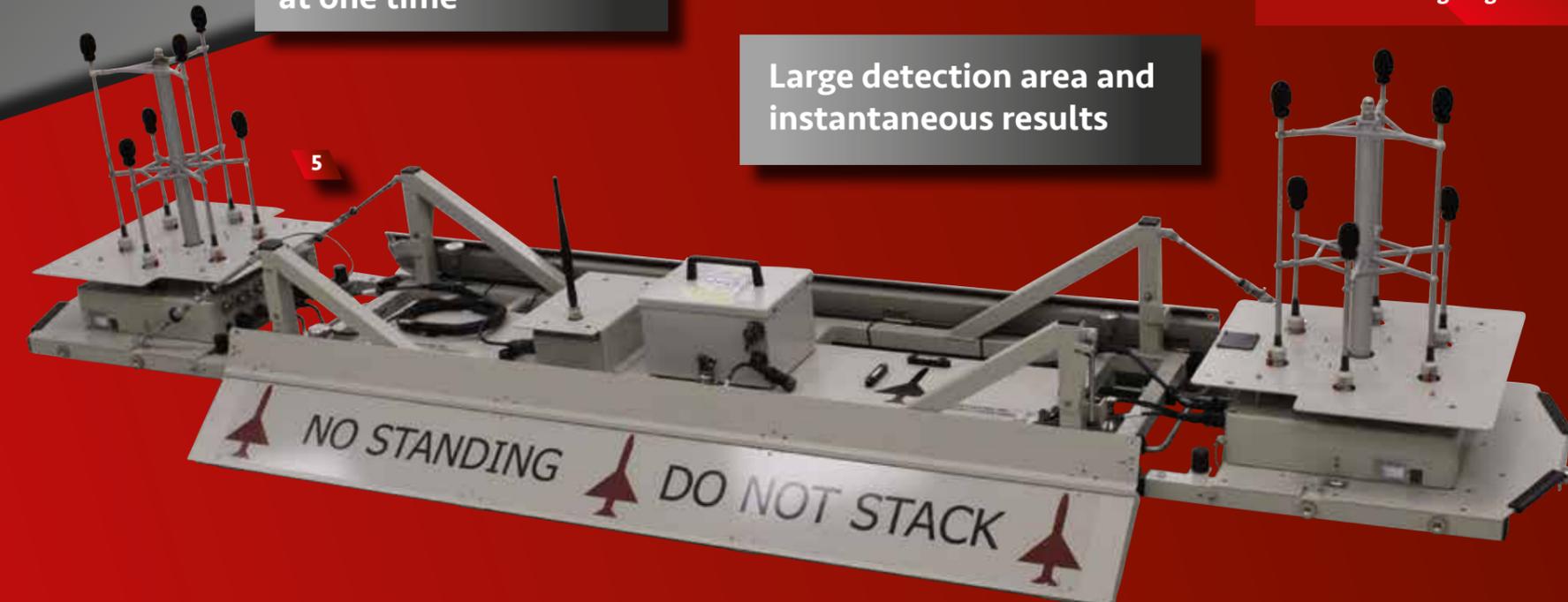
Air-To-Ground Strafe And Bomb-Scoring Systems



Multiple pilots training at one time

Large detection area and instantaneous results

- 1 Strafe System
- 2 Control Tower
- 3 Pilots and Target Area
- 4 Control Tower Example Set Up
- 5 Strafe Scoring Target



Ballistic Instrumentation And Range Design

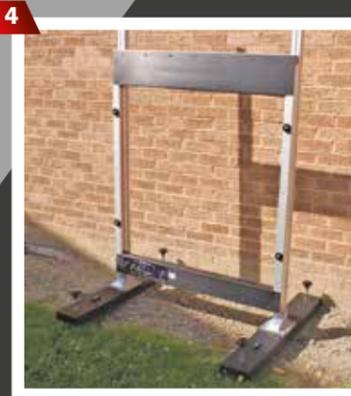
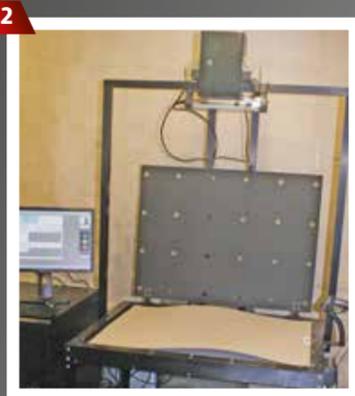
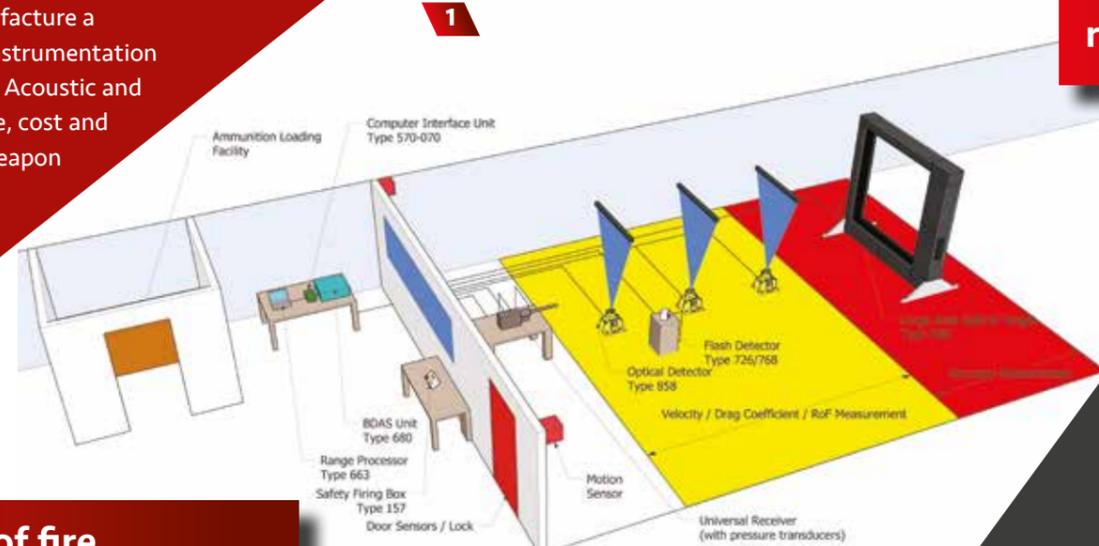
MS Instruments designs and manufacture a comprehensive range of ballistic instrumentation for highly accurate data recording. Acoustic and optical target systems are a precise, cost and time effective way of measuring weapon and ammunition accuracy.

Accurate up to 0.05%, rugged and portable

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.

Measure rate of fire, velocity and internal pressure



- 1 Test range
- 2 Strawboard Imager
- 3 PVMS - Optical and Triple Channel Remote Timer Unit
- 4 IVMS
- 5 Ballistic Data Acquisition System
- 6 Meteorological Station

Ballistic Instrumentation And Range Design

Wide range of solutions

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 0.05% 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.



Flight Followers

For a more detailed analysis of the flight of a projectile, MS Instruments has developed a highly accurate Flight Follower system.

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.

Product development and testing

Reduces time and cost of trials

The Flight Follower has several modes of operation which are software selected, depending upon the individual conditions of the test. It will FOLLOW 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.

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.

- 1 Medium Calibre Projectile
- 2 Supersonic Shock Waves
- 3 Mini Flight Follower
- 5 Horizontal Firings
- 6 Supersonic Shock Waves

2



Better than 0.1° tracking accuracy over 90° scan

3



Flight Followers

5



4



Mid flight update for impact analysis

Ballistic Testing

Wiltshire Ballistic Services



- 1 The Ranges
- 2 Visor Testing
- 3 Ballistic Testing Equipment
- 4 Ballistic Materials
- 5 Glass
- 6 Glass
- 7 Ballistic Test Facilities

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.

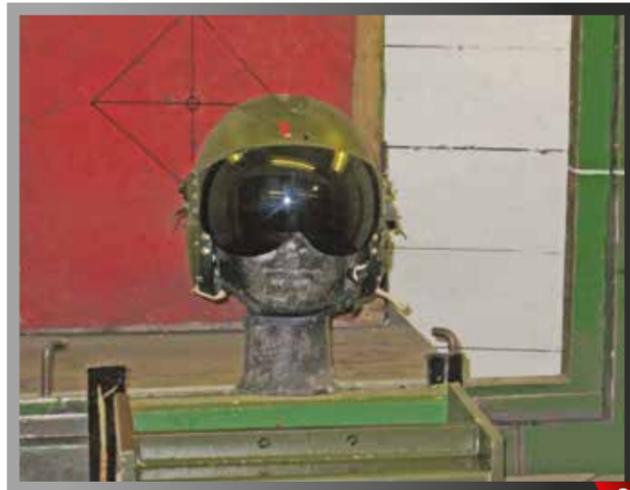
Independent from any weapon or armour manufacturers, quality approved to ISO 9001 and MOD Approved; WBS offers a full range of testing to international standards. Accessible whatever the weather, WBS offers test facilities unparalleled in the UK, using the most up to date and

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.

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.



1



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Test to national and international standards



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6

Ammunition, weapons and ballistic materials testing

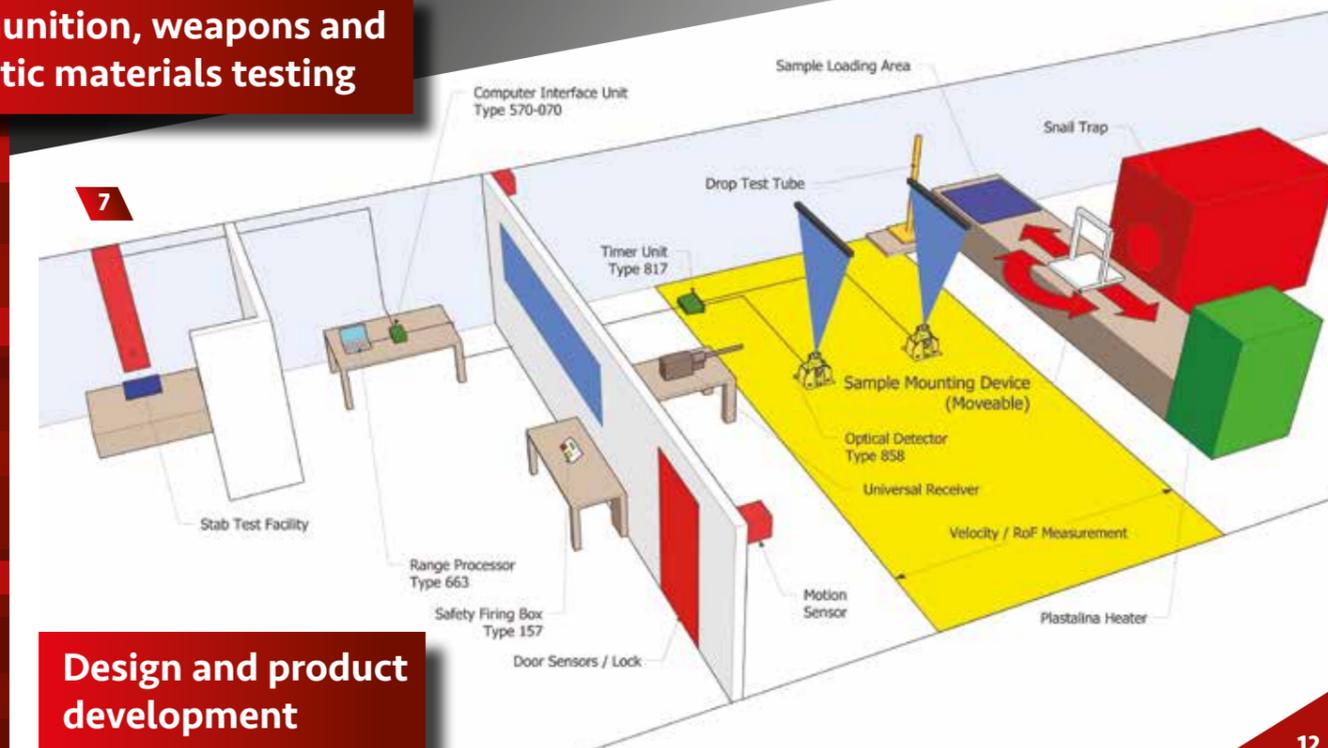
We can provide a bespoke service to supply all ballistic testing equipment including weapons, universal mounts, sample holders and instrumentation, for all natures of ammunition from 9mm to 40mm. We can test all samples, vehicles and building materials against small arms, cannon, bomb and IED attack. 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.

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 part of the UK Group of companies including MS Instruments Ltd, 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.

Ballistic Testing

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.



1

Ballistic gel analysis

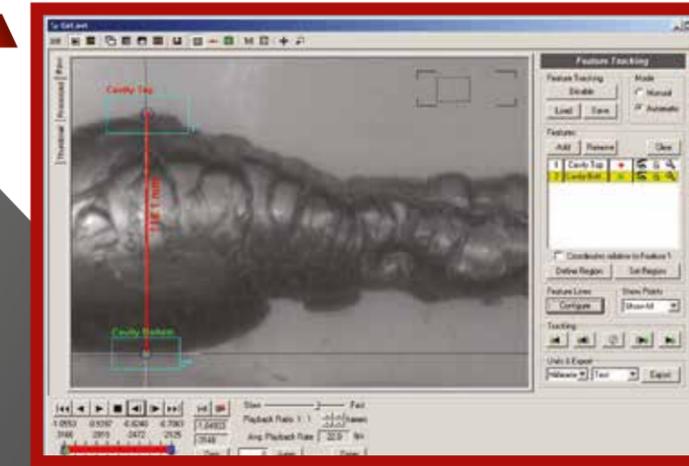
We provide equipment for ballistic gel analysis for both evidence gathering purposes and the study and demonstration of the effects of a projectile on body tissue. We also supply the software to deliver accurate analytical results, and the necessary equipment to make up ballistic gel to exacting standards. 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.

- 1 Gel Analysis
- 2 Ballistic Gel Analysis Equipment
- 3 Ballistic Gel Analysis
- 4 Gel

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.

3



Forensic Testing

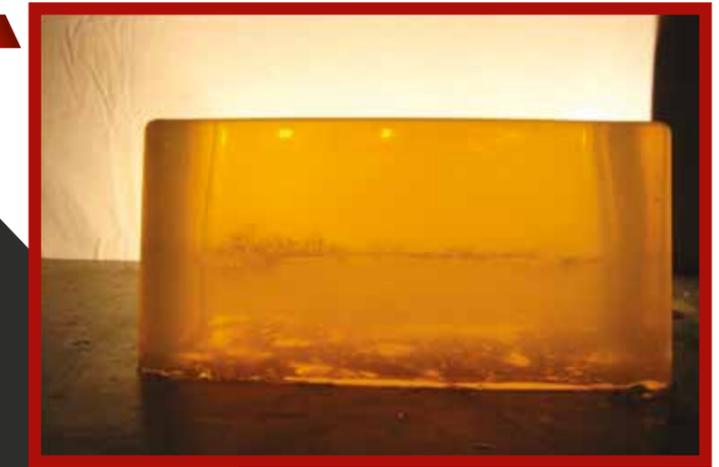
Instrumentation for understanding the characterisation of fragment size, energy and distribution

Officer weapons training and familiarisation



2

Measurements for weapon identification



4

Partition Panel Systems

Mission success is dependant on training that replicates real-world scenarios. We have three CQB reconfigurable partition systems which are accredited by the British Army (TAS) as "safe range infrastructure".

Our systems are different because they are modular and mobile meaning they can be configured into any layout or scenario. The Ballistic Panels have a unique retractable castor wheel base system which allows heavy panel to be easily and rapidly moved by just 2 people. PPS is also transportable as all our systems come in specially configured shipping containers, allowing them to be easily moved to new training locations or overseas bases.



PPS Lite panels are a lightweight, dynamic, modular system for Police and Military training.



PPS Heavy Duty panels are made for intense CQB training with paint marker and CQT ammunition.



PPS Ballistic panels are designed for 360° live firing scenario training with 5.56mm and all lower-energy ammunition.

1 The PPS Range



PPS Lite

PPS Heavy Duty

PPS Ballistic

PPS Bespoke MOE Doors

3



Container Packs

All panels are available in 6m (20ft) shipping containers. Container packs provide an ideal outdoor storage facility for the system. Container packs are available with layout plans which include a set number of door and window panels. Custom container packs are available on request.

CBQ Training House

PPS Close Quarter Battle (CQB) Training Houses are designed to create a cost-effective training facility for live fire training.

- 1 The PPS Range
- 2 PPS Lite Panels Scenario
- 3 Container Pack

2



Retrofitting

Partition Panels are an economical and easy way to upgrade existing training facilities. We advise on ways to optimise and improve training space and design plans to enhance facilities for live and non-live fire training.

Tested and Accredited

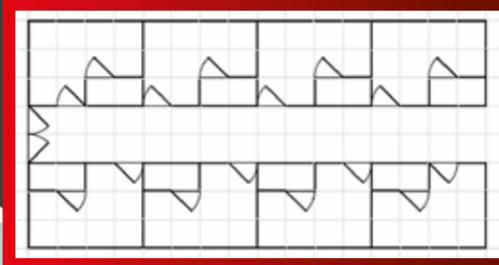
PPS are accredited as safe range infrastructure by the Technical Advisory Section (TAS Warminster, subject matter experts for small arms range infrastructure) of the United Kingdom Ministry of Defence.



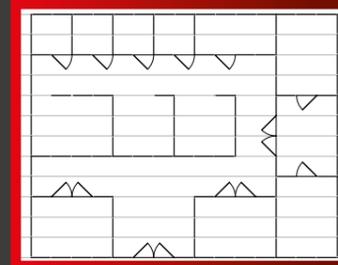
Partition Panel Systems

1

120 Panels - Hotel Floor
4 containers of Heavy Duty panels



130 Panels - Office
2 containers of Lite panel



Recreate Scenarios

Partition Panels can be configured into any layout to replicate the operational environment. Our range of panel systems are designed to be transportable in shipping containers, allowing you to quickly set up a training facility at overseas locations or forward operating bases.

Panel colours available:

- Black 
- White 
- Grey 
- Beige 

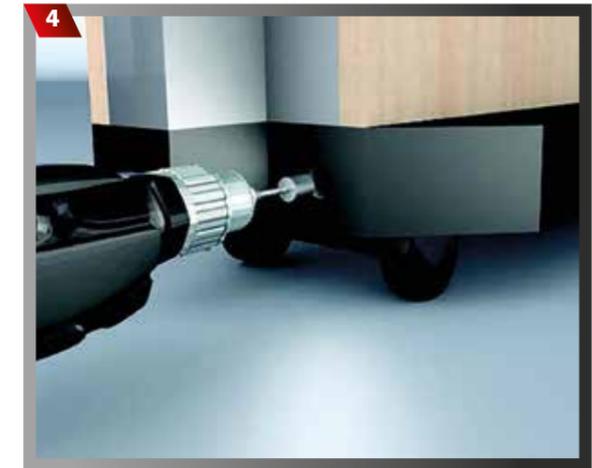
2



3



4



5



- 1 PPS Lite Panels Scenario
- 2 Heavy Duty And Ballistic Entry Frame
- 3 Lite Entry Frame
- 4 Retractable Castor Wheels
- 5 Bullet Trap System

There is a choice of two different entry frames.

Heavy Duty and Ballistic Entry Frame

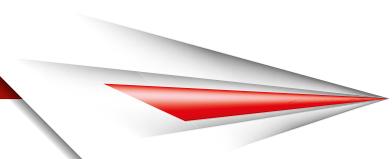
- Suitable for manual MOE breaching
- Sacrificial timber door frame for breaching
- Unique PPS retractable castor-wheel base for easy movement
- Entry frame can be converted into a window or hatch
- Use your own door types

Lite Entry Frame

- Two-man portable
- Reversible in/out door
- Left and right hinges
- Suitable for manual MOE breaching
- Weighted base supports for impact resistance



Find us



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