



# Surround Sound: Acoustic Weapon Location on the modern battlefield

*Acoustic Weapon Location (AWL) is an established and effective technology. But is it still relevant in an era when weapon locating radars are able to detect individual rounds in flight? The team at SELEX Galileo tells MOD DCB why sound ranging systems are still a critical part of a ground force's toolkit.*

In previous generations of warfare, linear battlefields were the norm, with friendly forces arrayed opposite enemy formations. Weapon locating radars behind the front lines could effectively spot the massed artillery of the enemy.

Times have changed. 'Forward lines' are an obsolete concept. On a modern battlefield, troops face enemies all around them, mingling with the civilian population. This has led to a need for troop protection in a full 360 degree arc.

## Plugging the gap

One solution to this problem is the weapon locating radar. Designed to detect and track incoming artillery and rocket fire, modern versions are able to track rounds in flight from 7.62mm upwards. This enables them to determine the point of origin of incoming fire.

However, there are several areas where the capabilities of weapon locating radars do not provide the complete coverage that troops rely on, leaving gaps in awareness.

It is these gaps that Acoustic Weapon Location (AWL) technology can fill. AWL systems are widely used, for instance with SELEX Galileo's own Hostile Artillery Location (HALO) system in service with six major Armed Forces worldwide. They detect acoustic (pressure) waves generated by gun or mortar fire and other explosions and use data-processing techniques to determine their locations. The systems can provide 360 degree coverage of a battlefield, something which would otherwise require as many as five weapon locating radars.

In addition to this surround coverage, AWL systems can protect against rockets fired in a 'direct fire' role, at such a low trajectory that they do not enter the field of regard of radars.

AWL systems can also ensure complete coverage with regard to time. With radars requiring regular maintenance, and in some cases not being able to operate during the highest temperatures of the desert day, AWL technology's 24/7 availability ensures that troops are kept aware of threats at all times.

Indeed, as a passive technology, systems such as HALO are resistant to jamming, preventing gaps in awareness caused by anti-radar weapons.

Importantly, AWL systems can determine the locations of hostile forces in situations where other systems are unable to do so. For example, if terrain is masking the location where an enemy is firing from, a normal doppler-type radar may not be able to provide troops with a firing solution. A problem may also arise if a radar is attempting to locate an enemy who is firing from behind a hill or crest very close by, as it will not be able to see the projectile long enough to trace it back to its point of origin.

In both cases, by sensing the acoustic signature of the enemy weapon firing, an AWL system would be able to provide an accurate targeting location.

*"Importantly, AWL systems can determine the locations of hostile forces in situations where other systems are unable to do so"*

## Evolving threats, evolving applications

It should be noted at this point that AWL technology has benefits that go beyond filling gaps in radar coverage. With the advent of global positioning satellites, modern AWL systems no longer rely on surveying and can be deployed in minutes rather than hours. In addition, the most advanced do not have to be deployed in a rigid template. These attributes make the system far more portable and have led Armed Forces to develop a range of uses for AWL technology based on the demands of current operations.

One such application is the provision of situational awareness for forward patrols. Day-to-day missions outside of forward operating bases are common; however, these troops will not always be covered by weapon locating radars. In these situations, AWL technology can keep troops aware of threats in the surrounding area and identify the location of mortars attacking such patrols.

Another modern use is for Improvised Explosive Device (IED) detection. Because of the acoustic-based technology behind AWL, the systems have proven to be effective in detecting static IED explosions, and can immediately warn an operational headquarters, updating the central intelligence picture by recording the location of IEDs and other acoustic events.

## Usage today

It is little wonder that Armed Forces around the world use AWL technology in day-to-day operations. UK Armed Forces deployed HALO systems during the latest Gulf War and are still using them today, both alongside their COBRA and MAMBA radars and as stand-alone systems. The United States and Canada use them on a daily basis on current operations.

The UK Sound Ranging Troop have been able to operate these AWL systems for more than six years without a major systems failure in extremes of temperature well outside the original specification of the system. Crucially, the systems have generated no false alarms, which would have led to problems if troops became dismissive of alerts.

Acoustic Weapon Location technology provides troops with timely information on where the enemy is firing from, and data accurate enough to engage the threat without risking harm to civilian populations. Both of these are essential when fighting today's asymmetric conflicts.

## Further information

For further information on, please visit:

Web: [www.selexgalileo.com](http://www.selexgalileo.com)

Email: [sales.marketing@selex.galileo.com](mailto:sales.marketing@selex.galileo.com)

**UK TRADE & INVESTMENT** **UKTI DEFENCE & SECURITY ORGANISATION**

### Helping Small Businesses Win Defence and Security Export Contracts

The Defence & Security Organisation (DSO) is a UK Trade & Investment business sector and its Small Business Charter initiative helps small companies to succeed in the highly competitive world of defence and security exports. Charter members each have a personal Account Manager from UKTI DSO's Small Business Unit who ensures that small businesses remain aware of the wide range of advice, information and support offered by UKTI DSO and helps them to get maximum benefit from it. This includes marketing advice and support, export policy and licensing information, military support and exhibitions (both at home and overseas). The Charter makes the following promise to all members:

- We will meet you or visit your company and learn about your products
- We will offer export military and marketing advice
- We will help you maximise the export potential of your individual products
- We will invite you to Charter activities and other relevant exhibitions, inward missions and briefings
- We will work hard to encourage and maintain a close and frequent two-way relationship with you

Charter membership also includes a free periodic newsletter – "Small Business" – which keeps companies informed on relevant news in UKTI DSO's small business support. Members also have access to the Charter Members' Forum – a section of the UKTI DSO website offering exclusive news of events and other Charter benefits. So don't miss – contact:

**HOWARD BINKS**  
 Head, Small Business Unit  
 Tel: +44 (0)20 7115 8294  
 Email: [Howard.binks@dti.gov.uk](mailto:Howard.binks@dti.gov.uk)

**CHARTER MEMBERSHIP AND THE SUPPORT OF THE SMALL BUSINESS UNIT IS COMPLETELY FREE OF CHARGE**

**SMALL BUSINESS UNIT**

[www.dti.gov.uk](http://www.dti.gov.uk)

**altodigital**  
your office technology partner

## THE SAFE WAY... TO SAVE ON PRINT

**A SAFE WAY TO SAVE ON COSTS**  
 Altodigital can bring you real cost reductions of up to 40% through our economically packaged programme, providing valuable savings on power consumption, toners, inks and paper, plus huge reductions in the amount of operator time required.

**AN UNRIVALLED CHOICE**  
 Because we are totally independent and not tied to any brand, we can create the perfect bespoke package of print and copy technology and service to meet every client's individual needs.

**AN EASIER WAY TO UNLOCK TECHNOLOGY**  
 Altodigital's high-tech after sales service, together with a dedicated support and account management team and our nationwide network of qualified engineers can be accessed by phone or via our online Service Portal.

**PROTECT INFORMATION ON THE NETWORK**  
 With Altodigital you can secure all confidential and business critical data on devices and ensure only authorised individuals have access to that data.

**TO ARRANGE YOUR FREE NO-OBLIGATION SECURITY AUDIT PLEASE CONTACT:**

Tel: 0845 504 5353 Email: [marketing@altodigital.com](mailto:marketing@altodigital.com) [www.altodigital.com](http://www.altodigital.com)

SUPPLIERS OF: **RICOH** **KYOCERA** **SHARP** **2010 Professional Partner**

**buying solutions supplier**

**OUR TOTAL SERVICE**