

# resolve

find | fix | engage | exploit | assess



## electronic warfare system

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## Delivering military advantage

The demands placed on communications surveillance and attack systems have never been so complex. Electronic Warfare (EW) operations in today's battlespace require intuitive, lightweight and rapidly deployable systems to monitor the constantly changing communications terrain. In today's contemporary operating environment there is a need to understand a potential threat and get inside the adversary's Observe, Orientate, Decide, Action (OODA) loop. RESOLVE is a force multiplier that delivers tangible tactical effect by enabling the operator to balance communications exploitation and denial underpinned by accurate geolocation information.

Acting as a trigger in the 'Sensor to Decider to Response' chain, RESOLVE's highly accurate position fix capability enables commanders to cue other ISTAR sensors maximising the utility of these low density, high demand assets.



# Geolocation, exploitation and denial of tactical communications

RESOLVE is a 100% UK state-of-the-art field proven electronic surveillance and attack system. It benefits from having both the software and hardware developed in conjunction with Roke's operational experts. More than 150 systems are now in operation in a number of countries.

## Tactical surveillance of military and civilian transmitters

RESOLVE is designed for the intercept, geolocation, exploitation and denial of tactical communications in the HF to UHF frequency bands, for both conventional and modern waveforms. A single RESOLVE system can be used in isolation to provide both full spectrum surveillance and Direction Finding (DF) capabilities using Angle of Arrival (AOA) techniques. When networked with other RESOLVE systems it is then possible to position fix targets and present them on a tactical map overlay.

## Networking and data fusion

With fully integrated wireless network connectivity, RESOLVE enables target data-fusion across the deployed baseline. This provides rapid target resolution, correlation and geolocation, through the use of the dedicated Management Information System (MIS) and Geospatial Information System (GIS) applications.



RESOLVE vehicle integration

## RESOLVE product suite

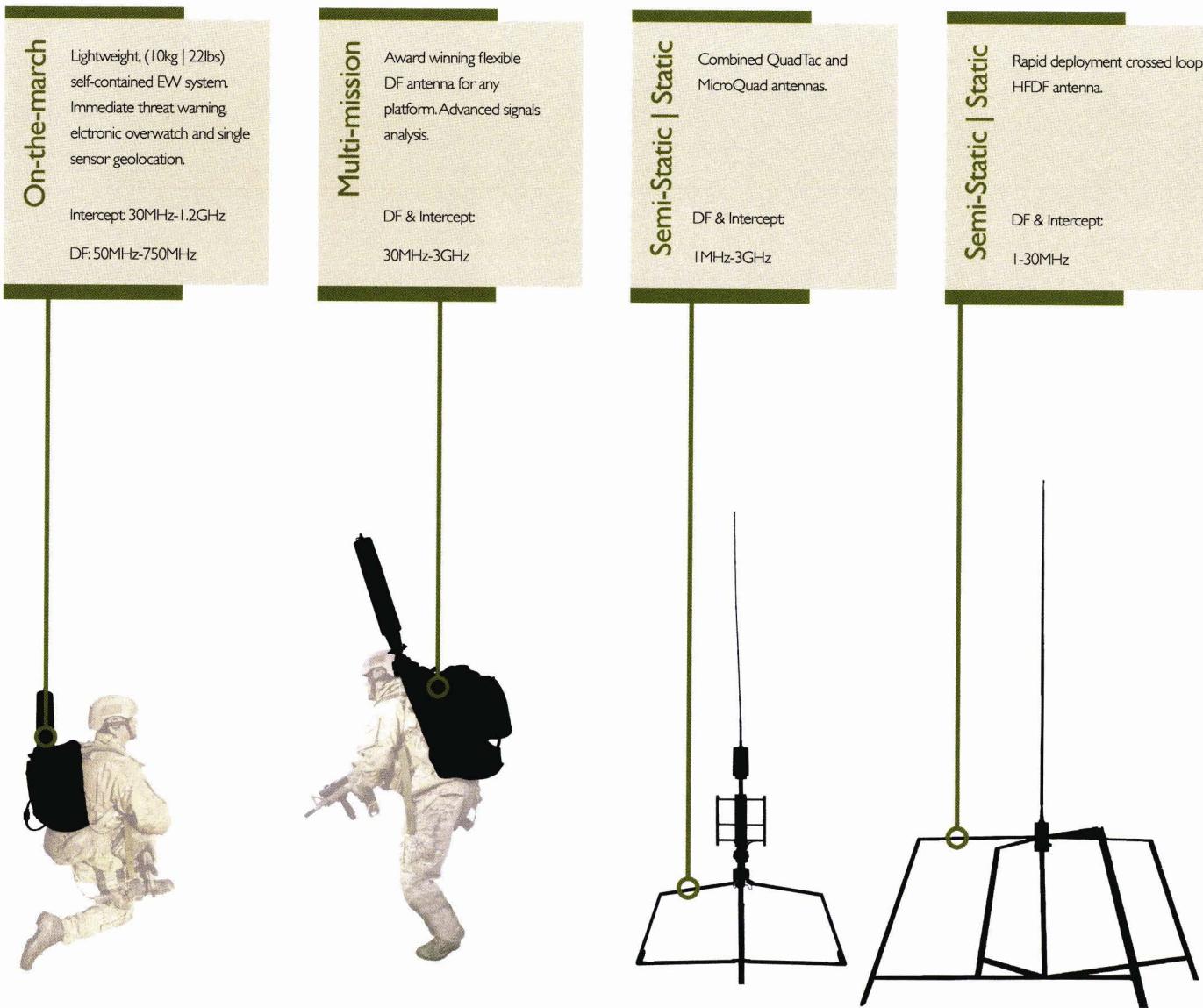
RESOLVE comprises a number of interoperable systems ranging from dismounts to fully integrated platform and static solutions.

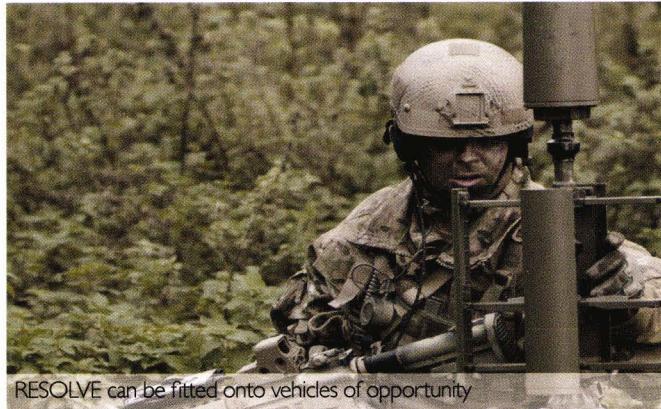
### Interoperability

Using the communications architecture, multiple systems can be networked together to perform collaborative position fix operations. RESOLVE provides an interface allowing interoperability with third party EW systems.

### Flexibility

The flexibility of RESOLVE ensures commonality across the equipment fleet whether mounted or dismounted delivering not only military advantage but reducing the significant training and support burden associated with a mixed equipment fleet.





**Vehicle**  
Antenna fitted to vehicle of opportunity.  
DF & Intercept  
30MHz-3GHz

**Vehicle (Integrated)**  
A QuadTac with longer antenna elements for increased sensitivity.  
DF & Intercept:  
30MHz-3GHz

**Static**  
Suitable for 7m to 50m masts includes VQuad and AGS in a radome.  
DF & Intercept:  
30MHz-3GHz



## One system – any mission

The RESOLVE EW Manpack can be deployed in a number of configurations including:

### On-the-march: Immediate threat warning for the dismounted soldier

The on-the-march configuration provides the dismounted operator with an unrivalled threat warning and direction finding capability. RESOLVE Manpack in this configuration is unique in that it operates while on the march, stationary or prone. Key to this is the QuadTac Mini or QuadTac antenna which can be operated with the array elements extended for maximum sensitivity, or closed to reduce the visual signature. A ruggedised PDA allows the operator to view the tactical DF plot, waterfall or spectral displays and input additional target information while maintaining tactical awareness.

### Next generation lightweight on-the-march capability

The operationally proven RESOLVE EW manpack system is now available in a lightweight, self-contained system specifically for operating whilst 'on-the-march'. Without compromising capability, the RESOLVE lightweight manpack system delivers immediate threat warning, electronic overwatch and single sensor geolocation, yet weighs just 10kg.

RESOLVE lightweight manpack system has been designed to reduce soldier burden for modern Electronic Warfare operations.

### Features

- Lightweight - only 10kg
- Real-time full spectrum surveillance and Direction Finding
- Ruggedised NVG readable PDA with user selected displays
- Low visual signature
- Fits in any military rucksack (including day sacks)
- High probability of intercept



RESOLVE lightweight manpack system

## Static configuration: Electronic overwatch for forward operating positions

Understanding an adversary's intent coupled with accurate geolocation information can only be achieved by network enabled sensors providing position fix solutions.

In the Static configuration the RESOLVE Manpack is used to provide networked EW capability at forward operating positions. Networking with other deployed RESOLVE systems provides enhanced EW capability such as automatic geolocation of signals of interest. In this configuration the full-suite of software applications can be utilised from the ruggedised laptop enabling rapid interpretation of hostile activity that provides threat warning, targeting and terminal guidance.

The Static configuration can be deployed such that the operator is co-located with the sensor element or remotely up to 50 metres from the antenna for covert operations.

## Features

- Networking and target data fusion across the RESOLVE deployed baseline
- Rapid target resolution, correlation, and geolocation
- Manpack for deployment in complex terrain, covert operations, and early entry
- Intimate support to the tactical war fighter
- Offline analysis and playback facility
- Backhaul enabled – delivers accurate operational picture to decision makers

## On-the-move: Single sensor geolocation for vehicles of opportunity

The on-the-move configuration uses the same RESOLVE Manpack to provide a threat warning and running fix capability on vehicles of opportunity. Utilising the RESOLVE Universal Adaptor the QuadTac antenna element can be quickly mounted onto any vehicle. Operators then have the choice of using the PDA or ruggedised laptop which gives access to the full suite of EW functions.

## Features

- Running Fix - while on the move multiple lines of bearing can be aggregated to establish a position fix.
- Extended Operations - RESOLVE Manpack is able to harvest power from the vehicle of opportunity.

## Flexibility & interoperability

RESOLVE can be fitted into a variety of platforms while maintaining the flexibility to be easily dismounted for use in complex terrain or discreet operations.

The VQuad antenna can be elevated up to six metres for increased sensitivity. With the addition of the Quadrant or MicroQuad HF antennas, full spectrum coverage is achieved.

With the antenna nested the vehicle can conduct on-the-move position fix operations. Using course over ground from the built-in GPS, numerous lines of bearing are aggregated (running fix) to establish position fix solutions. When stationary the mast can be elevated and an orientation reference is taken from the built-in compass.

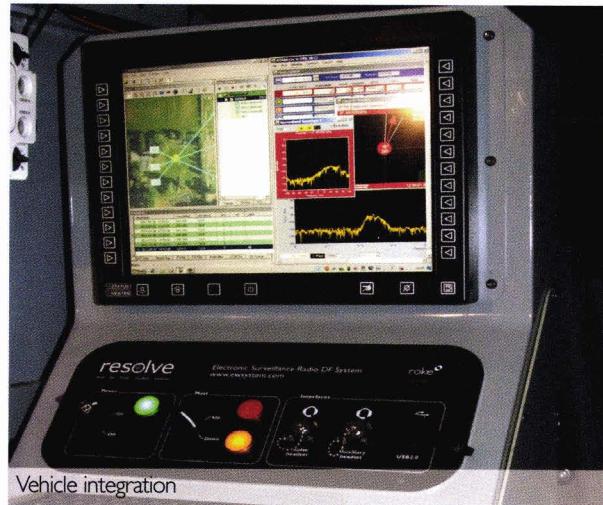
- Increase range
- Power is harvested from the host vehicle negating the need for batteries
- Interoperable with dismounted RESOLVE systems
- Running fix

### Maritime

RESOLVE can be rapidly installed into any maritime platform to provide single sensor intercept and geolocation, using running fix techniques. The mast sensor can be remoted via fibre optic cable therefore minimising cable loss. With a long heritage in RF modelling on naval platforms we can advise on optimal antenna locations and de-risk any potential coupling issues. Commonality of sensors in the land and maritime environments ensures interoperability which is essential to maximise operational effectiveness.

### Vehicle integration

RESOLVE has been successfully integrated onto a number of vehicles whether dedicated EVV platforms or as part of a multi sensor ISTAR capability. The VQuad can be radome protected for permanent installations and mast mounted to increase range when stationary. When moving, a single platform can deliver a position fix solution using running fix techniques and data can be rapidly transferred using a common communications architecture. In addition RESOLVE can be easily integrated into a Battle Management System allowing the user to push intelligence to a Common Operating Picture at the tactical, operational and strategic levels.



# Extended range

## Mast mounted

A range of static mast mounted electronic surveillance solutions are available to meet a variety of operational scenarios. Covering the full detection range and with installations from 7m to 50m these antenna configurations extend both the range and sensitivity of a RESOLVE system.

## Mast Sensor

The RESOLVE Mast Sensor has been developed for use on large masts (7m - 50m). This configuration houses the RESOLVE AGS unit (the sensor at the heart of the system), switch box and VQuad within the radome (not shown). Digitising at the antenna allows for increased height while avoiding RF loss on the cable.

An optional addition to the Mast Sensor, MastQuad provides high sensitivity, seamless coverage from 20MHz to 3GHz. The folding dipole design is easy to erect and provides increased sensitivity and DF accuracy at the lower operating frequencies.

## VQuad

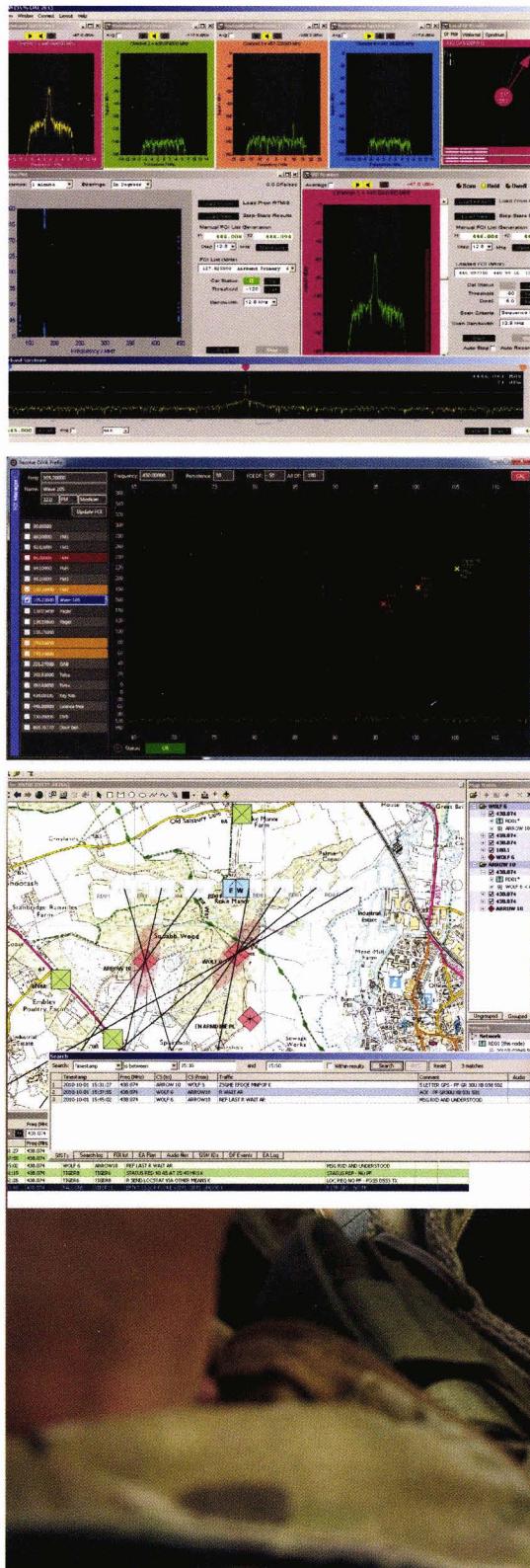
The VQuad can be mast mounted, radome protected, and elevated up to seven meters or mounted permanently onto any platform. VQuad is based on the field proven and award winning QuadTac, however, there is no requirement for the dipole arms to close which allows for larger dipole elements to be used. This provides increased sensitivity at the lower operating frequencies.

## AGS3

The latest generation AGS3 (Acquisition and Geolocation Sensor) is equipped with a DC input range of 10.5 - 32V allowing compatibility with vehicles, and low noise amplifiers maximising range and coverage for surveillance and geolocation.



## Real-time exploitation



### Converting collection to intelligence

The Graphical User Interface (GUI) provides operators with intercept data in real-time.

The RESOLVE system is controlled using the ruggedised laptop running a suite of intuitive, integrated applications which enables the operator to execute complex tasks. The Mission Information System provides a dynamic and immediate operating picture presenting the intelligence in a format that is easily interpreted.

### Features

- Intuitive interface
- Powerful Mapping
- Wide and narrow band survey
- Recording for offline analysis and playback
- Networked Ops (chat, file transfer, event sharing)
- Position fix of intercepted signals
- Running fix
- Civil waveforms

# Communications denial

## Non-kinetic strike

The Electronic Attack subsystem provides a software integrated, hostile communications denial capability. Using powerful software applications the operator is able to balance exploitation and denial ensuring that disruption to hostile C2 is optimised.

This optional capability is based around commercial off the shelf EA equipment and is controlled from the ruggedised laptop using a dedicated EA application.

## Features

- Integrated EA software
- Modular sub system enables missions to be task equipped
- Pre-emptive and responsive techniques
- Omni-directional or directional antennas

## Training and support

We have operational staff that are familiar with the contemporary operating environment and will help tailor a system to meet your needs. We will analyse your mission requirements in a strategic context, consider through life support and recommend the optimal and most cost-effective package to meet your needs, including logistics, training and maintenance.

The RESOLVE training course covers all aspects of the system including:

- Basic and advanced EW techniques
- System setup and configuration
- Development of tactics, techniques and procedures
- Support and maintenance

Training courses are delivered by Roke's operational experts at our dedicated RESOLVE Operation



Photo Caption

For more information or to speak with one of our operational experts regarding the enhanced capabilities of RESOLVE, please contact:

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