

743D Martello

3D Long Range Air Surveillance Radar



GEC-Marconi



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The world's leading long range air surveillance radar

The GEC-Marconi 743D Martello is a high performance long range 3D radar system designed primarily for military applications.

Martello has evolved through successive generations to become recognised as the world leader in long range air surveillance radar.

It has proved itself in service with the British Royal Air Force and NATO, as well as other armed forces around the world.

GEC-Marconi has been at the leading edge of radar development for more than fifty years and has pioneered many of the technologies in this world-beating system.

Martello offers unsurpassed long range detection of small, fast targets at distances beyond 200nm (370km). And it does so in even the harshest of clutter and electronic countermeasures (ECM) environments. Its instrumented range extends to 256nm (470km).

L-band operation

Unlike many competitive long range radar systems, Martello operates in L-band (NATO D band). This gives several major benefits in target detection, clutter suppression and reliability in all types of climate, world-wide. All of which results in maximum operational efficiency.

In addition, L-band operation gives Martello excellent performance against ECM and 'stealth' aircraft as well as minimum susceptibility to anti-radiation missiles.



Low power requirement

A major advantage of L-band is that for any given range, detection and resolution, its much larger antenna allows a lower mean transmitting power compared with S-band.

This means that high reliability solid state transmitters can be used. This in turn, means that the prime power necessary to operate the system is much lower than that needed by S-band systems. A major advantage in a transportable system.

Advanced technology antenna

At the heart of the Martello system is its planar array antenna, designed, developed and perfected by GEC-Marconi over more than twenty years. Used for both transmitting and receiving, it consists of 40 high precision linear row boards, each with 62 radiating dipoles, which are supported on a sealed box spine. It rotates at five or six revolutions a minute to give 360° surveillance with a 10 or 12 second update.

In effect, with its associated solid state transmitter and receiver modules, it is equivalent to 40 identical radars working together in a controlled phase relationship.

The principal feature of the antenna array is its extremely narrow azimuth beamwidth of 1.4°, combined with ultra-low sidelobe characteristics. These characteristics are achieved by an accurate, high efficiency, microwave power, weighted distribution network in each of the row boards. This prevents the entry of enemy jamming signals at all angles other than on boresight. It also denies anti-radiation missiles a 'lock-on' signal at all angles other than on boresight.

A Secondary Surveillance Radar comprising a large vertical aperture (LVA) antenna mounted above the main primary antenna array and an all solid state Interrogator/Responder enable identity, altitude and plan position information to be collected from co-operating targets.

Total coverage on every antenna revolution

Thirty-two distributed solid state transmitter modules, each with its own precise phase and amplitude control, produce a fan beam that illuminates every target on every rotation of the antenna.

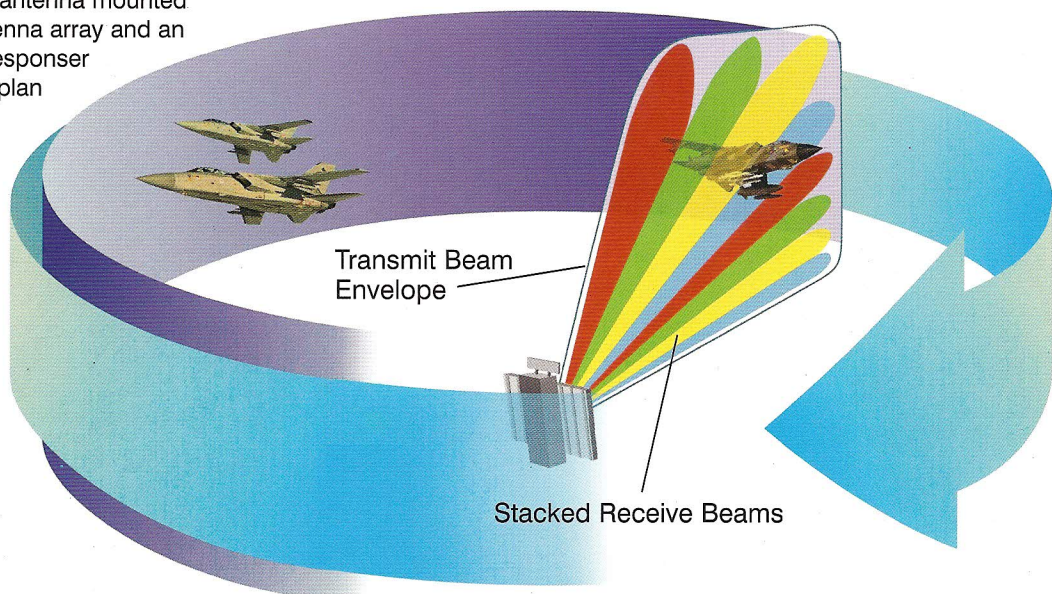
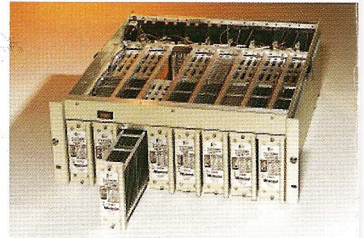
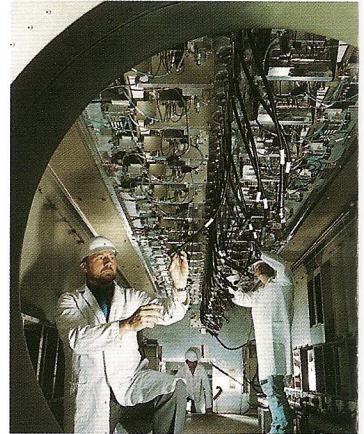
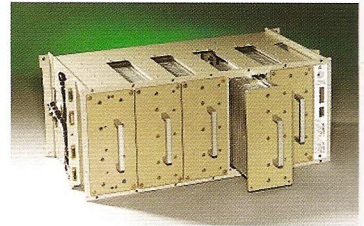
The transmission system is highly stable and can operate in either fixed frequency, burst agile, or pulse agile modes to give maximum protection against ECM.

Each of the antenna's forty row boards has a separate receiver. The signals from them are combined passively to form eight simultaneous overlapping stacked vertical beams that cover the transmission envelope.

This combination of fan beam transmit and stacked beam receive is the key to the high performance of Martello. It allows optimum processing for better clutter rejection and false alarm control than is possible with a scanning pencil beam or scanning cluster beams.

Both transmitters and receivers are housed within the spine of the antenna, which is sealed against EMC and EMP.

Extremely high range accuracy and resolution, together with improved clutter suppression are made possible by the high pulse compression sweep rate. Pulses are compressed to around 0.25mS, which is a much greater degree of compression than any competitive system.



Low cost of ownership

The Martello is capable of operation with both main and standby control centres. The radar has been designed to be totally remotely controllable, reducing the need for manning radar sites and, consequently, cutting operating costs. Even signal processing parameters can be controlled remotely.

In addition, Martello has extensive built-in test equipment (BITE), enabling it to be monitored from a remote site. However, the system is based on fault-tolerant, multi-channel architecture so maintenance can be deferred to an operationally convenient time.

Maximum graceful degradation in all sub-systems gives the operational benefits of extremely high availability and adds to the low cost of ownership.

Easily transportable

Martello is designed and built to fit standard ISO pallets for easy transportation by road, rail, sea or air. This not only provides maximum flexibility in operation, it also minimises the risk of pre-targeted attack.

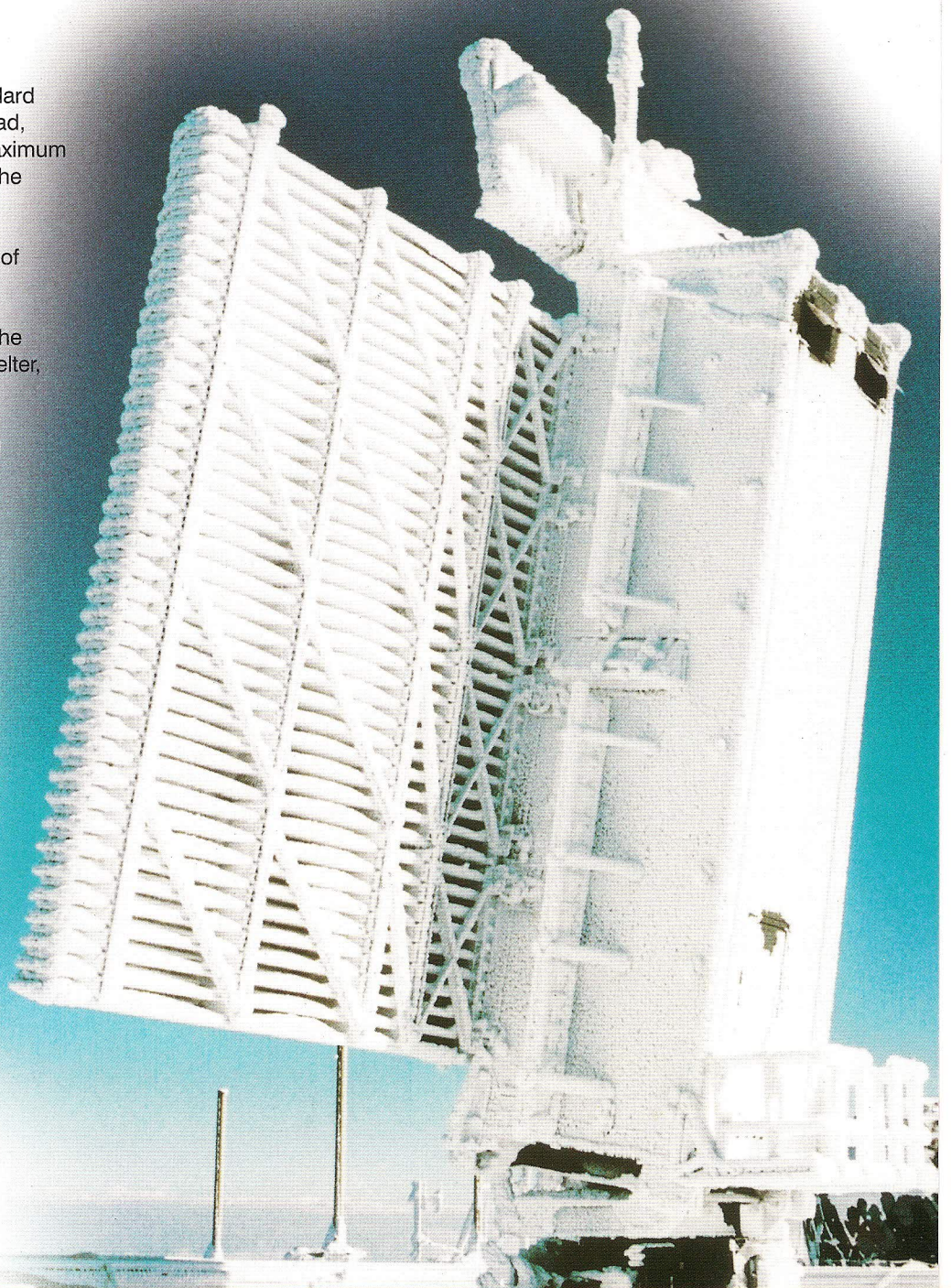
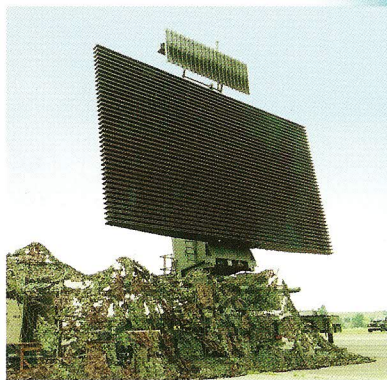
The system can be deployed by a team of ten trained men in less than four hours.

When deployed, the system consists of the antenna assembly and an electronics shelter, with its associated support pallet. Flexible cables up to 40 metres long are the only interconnection needed, making installation quick and easy, and allowing freedom in the choice of site.

The system can, of course, also be deployed in a static location.

Civil applications

Although designed primarily for military applications, the Martello architecture is also ideal for use in joint military and civil air surveillance, so reducing the capital outlay necessary for radar coverage.



Martello features

- L-band operation.
- High efficiency planar array antenna.
- Solid state transmitter and receiver electronics.
- Long range, three-dimensional detection of small targets.
- High accuracy and resolution.
- 256nm (470km) instrumented range.
- 100,000ft (31km) instrumented height.
- Elevation coverage from -2° to $+20^{\circ}$.
- Fan beam transmit, stacked beam receive.
- Transportable in ISO pallet sized loads.
- Optimum clutter suppression.
- Maximum graceful degradation.
- High system availability.
- EMC and EMP proof.
- SSR sub-system incorporated.
- Ideal for joint military and air traffic control applications.

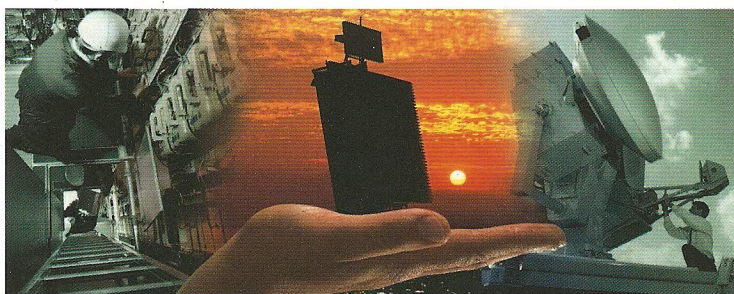


Lifetime support

GEC-Marconi is fully committed to providing lifetime support for its Martello radar systems, covering every aspect of support, from installation and commissioning, through repairs and in-territory maintenance, to specialist training, logistical support and enhancements.

Martello is a high performance, low maintenance system built by one of the world's leading suppliers of radar systems, with a reputation for reliability, cost effectiveness and unequalled customer support; GEC-Marconi.

As part of the £Multi-billion GEC organisation, the company has links to the group's research centres backed by a huge investment to ensure that it remains at the cutting edge of radar technology.



How to find out more

It is only possible in a brochure such as this to give very brief details of the GEC-Marconi Martello Long Range Air Surveillance Radar System. For further information, please contact the company at the address opposite.

GEC-Marconi.
Your first choice in radar systems.

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