

Marconi
Radar Systems

Martello S723



Martello

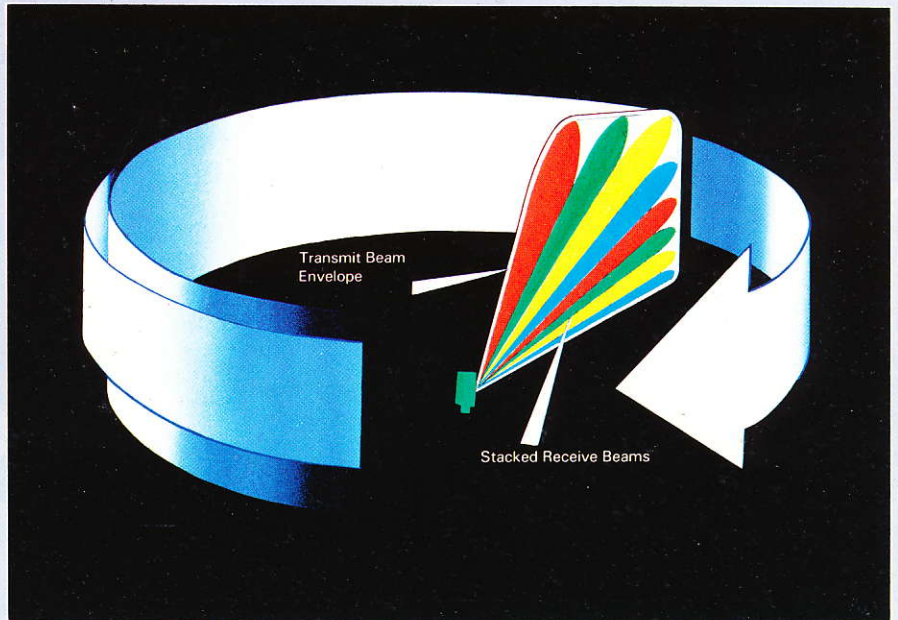
The Marconi Solid-State 3-D radar system type S723

- ★ 23cm band (NATO 'D' Band) operation
- ★ Range, azimuth and height data on every target, every revolution
- ★ Solid-state distributed transmitter
- ★ Uncommitted frequency agility
- ★ Pulse compression
- ★ Low sidelobe planar array antenna
- ★ Distributed receiver system
- ★ Adaptive signal processing throughout the cover
- ★ Comprehensive ECCM
- ★ Automatic radar management with manual intervention facilities
- ★ Comprehensive monitoring and diagnosis facilities
- ★ High availability with minimum manning
- ★ Reliability with minimum maintenance
- ★ Transportable or static



Martello S723

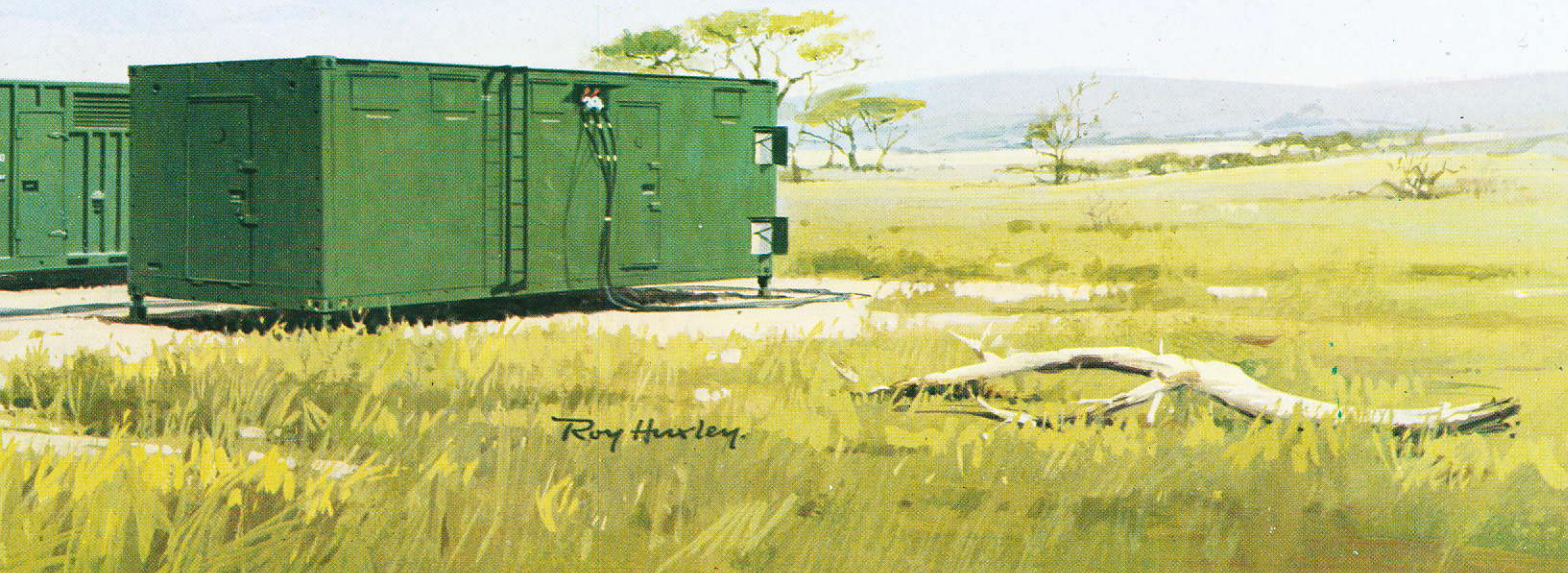
is a stacked beam radar with a unique parallel receiving system for height finding. Bearing, range and height are available on every target on every revolution of the antenna. The planar array is a vertical stack of horizontal linear arrays, each with its own receiver module. Each array has the same shaped amplitude distribution, giving a narrow azimuth beamwidth. Low sidelobes are achieved by precise control of the amplitude and phase fed to each array element. In elevation, the phase of the RF power in the transmitter modules is controlled to give cosec squared cover. Every target within the elevation cover is illuminated on every transmission. Returns from a target are received by all arrays. The individual receiver outputs are then combined in a simple passive beam forming network. This synthesizes eight elevation beams, matched to the required elevation cover. All eight beams have pulse compression and signal processing under automatic control, with manual overrides available. Target range and azimuth are extracted from a series of individual returns by the plot forming unit. Monopulse measurements of returns in adjacent elevation beams yield the corresponding height data. Plot range, azimuth and height are correlated with extracted IFF/SSR data for onward transmission to operations centres. The system is self-adaptive to the radar environment. The radar manager has comprehensive facilities for monitoring system performance and has complete control of system parameters.

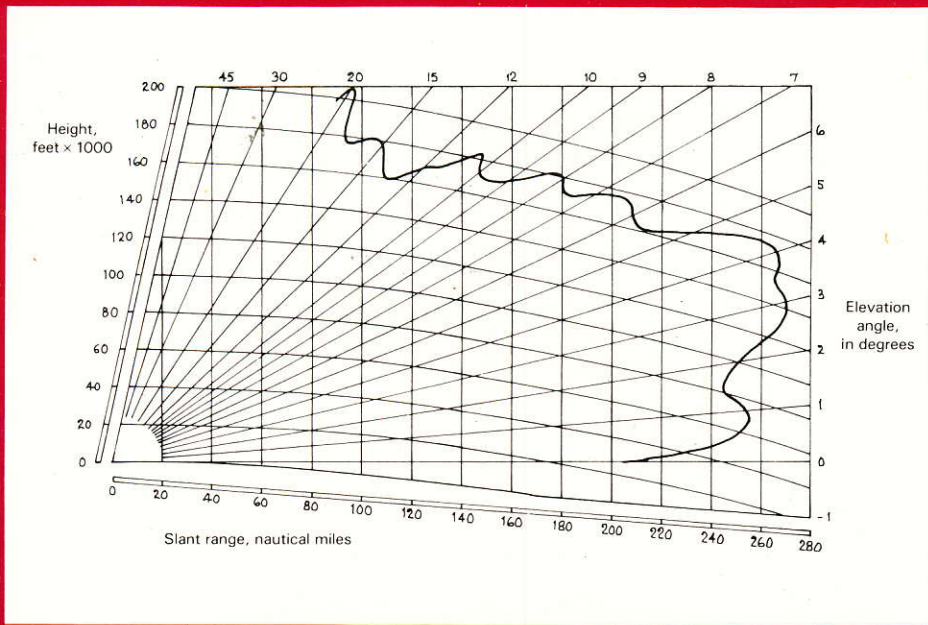


Principles of Operation

Martello system elements

- ★ ANTENNA
 - 40 row squintless planar array
 - Distributed transmitters and receivers
 - Unique beam forming network
 - Synthesizer (driven)
 - IFF/SSR antenna and interrogator
 - Trailer-gantry
- ★ ELECTRONICS CONTAINER
 - Eight beam signal processor
 - Locus 16 computer
 - PPI management display
 - Television tabular display with touchmask man-machine interface
 - Primary-secondary plot extractors
- ★ ANTENNA MODULE CARRIER
- ★ OPERATIONS CONTAINER (optional)
- ★ DIESEL GENERATOR





Typical cover on small aircraft

Performance

Characteristic	Instrumental cover	Accuracy	Resolution
Range	14 – 256 NM (23 Km – 474 Km)	525 ft (160 m) rms	607 ft (185 m)
Azimuth	360° at 6 rpm	0.2 NM at 100 NM (370 m at 185 Km)	1.5°
Height	200 k ft (61 Km)	1700 ft at 100 NM (518 m at 185 Km)	
Elevation	0 – 20°		

Detection range, small fighter aircraft, 270 NM (500 Km)

Data summary

ANTENNA:

Aperture 7.1 m high × 12.2 m wide
 Azimuth beamwidth 1.4 degrees
 Sidelobes, off axis -45 dB
 No azimuth squint with frequency

RECEIVER:

No of channels 40
 Noise factor 2.5 dB
 No of beams 6 or 8
 Beam forming at intermediate frequency

TRANSMITTER:

No of modules Up to 40
 Effective peak power Up to 132 kW
 Mean power Up to 5 kW
 Pulse duration 150 µ sec
 Frequency agility 10% (23 cm band)

SIGNAL PROCESSING:

One processor per beam
 4 pulse digital MTI with Doppler compensation, time varying weights and pseudo random stagger

IFF/SSR SYSTEM (OPTIONAL)

Characteristics to meet customer requirement
 Primary/secondary plot combination

ENVIRONMENT (WITHOUT RADOME)

Temperature -40°C to +55°C
 Solar radiation 1140 W/m² for 4 hrs
 Rain 140 mm per hour
 Snow 100 kg per m²
 Ice 12.5 mm
 Dust Particles up to 1 mm
 Concentration 1.4 gm/m³
 Wind 28 m/s gusting to 42 m/s

A range of models is available which permits less demanding requirements to be met cost effectively.

Marconi

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