SHF Multi-channel Radar Link

A NEW FLEXIBILITY is introduced into the design of radar systems by the Marconi Radar Link equipment which is capable of relaying up to three high-quality radar pictures simultaneously over long distances. The Link was demonstrated at the 1956 Farnborough Air Show in co-operation with London Airport Radar. Its use removes the necessity of siting the component parts of a radar system within a short distance of each other, and also presents a means of achieving greater speed and accuracy in data handling – an ever increasing necessity in the world of high-speed transport.

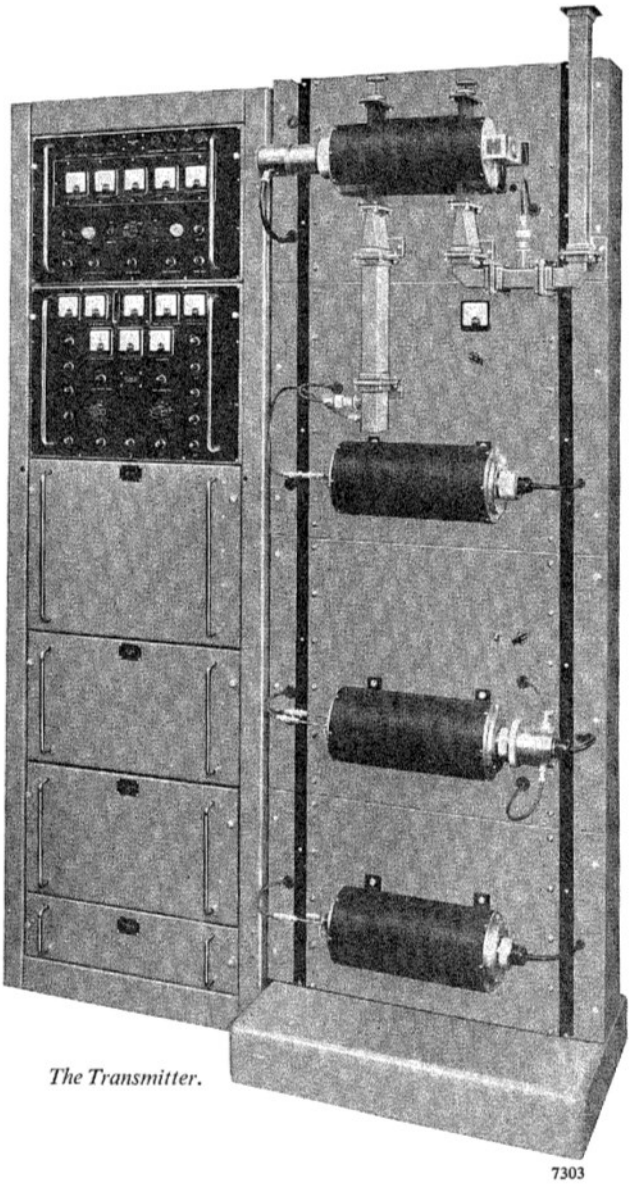
The main applications of the radar link, which incorporates the latest techniques and refinements, may be summarised as follows:

(1) Where the site of a radar station is too vulnerable or too inaccessible for the operations centre.

(2) Where two radars of different characteristics, with their heads sited in different places, are viewed on the same display system.

(3) Where the associated organisation is split into two or more sections, remote from each other, with remote displays at each point.

(4) For the co-ordination at a central control position of the activities of a number of diverse radar stations.



The Transmitter.

7303

FEATURES

Vastly increased scope of operation introduced into the field of both civil and military radar.

High data handling capacity is an important feature. In a typical arrangement two of the

channels may employ 2 microsecond pulse widths while that of the third can be as narrow as 0·5 microsecond. All channels are complete with azimuth turning and auto-align data and in addition telemetering, system switching and two-way telephone conversation can function simultaneously.

Freedom from accidental interference and deliberate jamming is afforded by the use of frequency modulation and a very narrow transmitted beam.

Security against unauthorised interception provided by the narrow beamwidth and the complexity of the transmitted signal.

Reliability of operation is ensured as both the frequency band employed and the method of modulation used are unimpaired by weather or fading effects.

Long distances can be covered by the use of repeater stations, distances in excess of 200 miles being easily achievable subject to proper initial survey.

CONSTRUCTION

Transmitting and receiving terminals both consist of a rack of radio-frequency equipment together with three or four racks of channelling and modulation apparatus. The rack equipments consist of easily withdrawable, easily accessible units, particular attention having been paid to the maintenance aspect.

Horn-fed paraboloid aerials are employed at both transmitting and receiving ends.

Repeater stations are simple in construction as demodulation and re-modulation is avoided. They contain only two racks of equipment and two aerial systems and are capable of unattended operation over long periods of time.

The equipment can be contained in static installations housed in suitable buildings, or in mobile units contained in vehicle-mounted cabins or trailers.

CIRCUITS

The individual channel components amplitude-modulate sub-carriers and these are then combined into a composite signal used to frequency-modulate the main carrier, operating at 4000 Mc/s.

Travelling wave tubes are employed and it is their special properties of large-gain bandwidth, broad-band match and low noise figure that enable a large number of signals to be transmitted simultaneously over several 'hops' with negligible degradation of picture quality. After seven 'hops' a peak noise of not less than 30 dB below peak radar signal can be expected in each channel.

DATA SUMMARY

Radio frequency: 4000 Mc/s.

Power output: 2–3 W.

Frequency base-band: 8 Mc/s.

Receiver noise factor: 12 dB.

Linearity: To within ±1%.

Intermodulation: —40 dB.

Video response:
Amplitude/frequency response: Within ±1 dB.
Gain: Stable to within ±1 dB.

Angular error: 15 min. peak-to-peak.

Max. aerial rotation speed for auto-align: 12 r.p.m.

Max. aerial rotation speed: 25 r.p.m.

Marconi

MARCONI'S WIRELESS TELEGRAPH COMPANY LIMITED

Marconi House, Chelmsford

Telephone: Chelmsford 3221. Telex: 1953. Telegrams: Expanse Chelmsford Telex