Marconi 40 ft Diameter Air-Transportable Aerial for Military Applications

Modern defence planning calls for maximum flexibility in the deployment of tactical bases, and communication—the most vital link in the command chain—must be arranged to facilitate this. Where military units may be summoned, often at very short notice, to any part of the world for peace-keeping operations, the ability to continue to communicate back to command headquarters, via rapid, reliable and secure links, is of paramount importance.

Recognizing the need for tactical flexibility, Marconi's have developed an air-transportable satellite communication tracker and versions for the Ministry of Defence are now in operational use for Britain's first military Satcom system.

FEATURES

40 ft diameter high profile accuracy parabolic reflector. No adjustment required to individual panels.

Cassegrain/Static-Split feed system for communication and tracking outputs.

Fully-steerable, incorporating a non-orthogonal mount for tracking both synchronous and medium-altitude random satellites.

Digital encoders for azimuth and elevation data take-off.

Fully air-transportable with packaging arrangements to suit Lockheed C.130 Hercules or Short Belfast aircraft.

Re-erection and into service within 72 hours from arrival at site.

Special cabling arrangements eliminate the need for slip-rings.

Provision of air-inflatable radome for difficult environmental conditions.

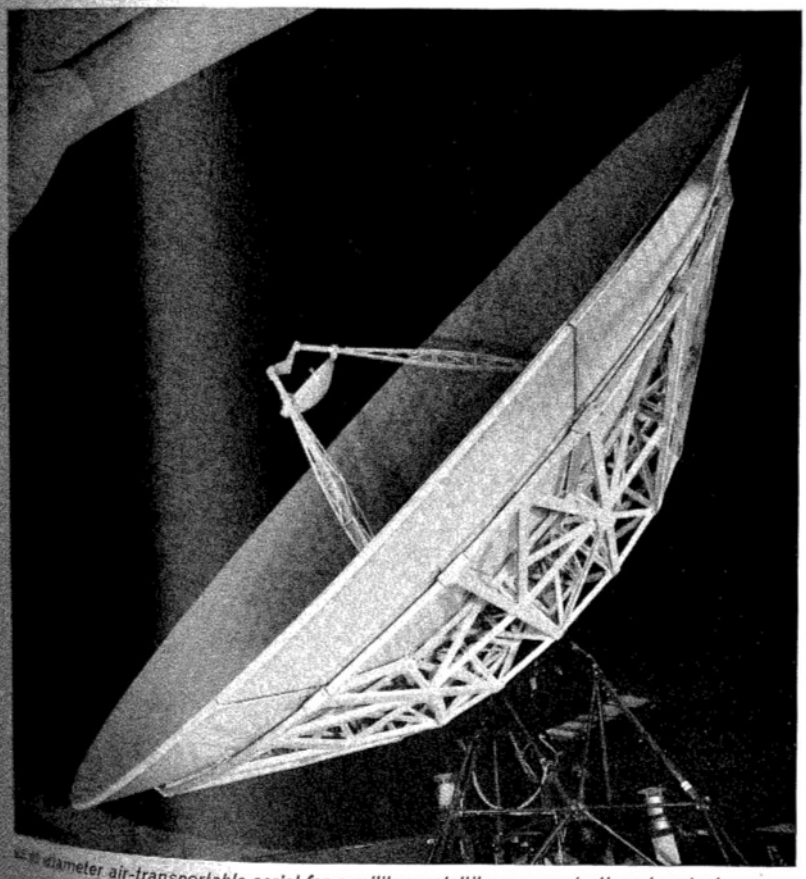
Construction

The aerial consists of a 40-ft diameter paraboloid incorporating a Cassegrain system for illumination of the reflector, which has a focal length of 12 ft.

The reflector is constructed of 2-in. thick aluminium honeycomb sandwich panels mounted on an aluminium backing framework. This back structure consists of a central aluminium cast cylinder with radial and interconnecting ribs attached to it, which are broken down into the main component parts for transportation.

Over a production run, overall surface accuracies of better than 0·035 in. r.m.s have been achieved, even after repetitive assembly of panels in a random choice. No adjustment is required to individual panels. The secondary reflector is an aluminium machined casting of high profile accuracy. The aerial feed system uses a static-split (4 horn) technique for communication and deriving tracking information, with the first stage low noise amplifiers mounted on the back structure close to the feed.

Movement of the aerial in elevation is produced by rotating the dish on a skew or non-orthogonal bearing, and permits the aerial to follow synchronous and medium-altitude random orbit satellites passing close to the zenith. The base of the aerial support structure contains a circular track, running on 6 bogie units on the ground. The complete aerial can be driven ±350° in azimuth on these bogies. The limits in elevation and azimuth enable cables to be run through the two planes of rotation without the use of slip-rings. The transmitter with its power supply and cooling system is mounted in two self-contained units in the base of the aerial structure and in this position they rotate with the aerial.



40 ft diameter air-transportable aerial for a military satellite communications terminal

DATA SUMMARY

Frequency range:
Transmit; 7975–8075 MHz
Receive; 7250–7300 MHz
Reflector Paraboloid: With Cassegrain sub-reflector.
Feed: 4 horn, static-split system.
Surface tolerance: 0·035 in. r.m.s overall.
Azimuth movement: ±350°.
Elevation movement: ±320°.
All-up weight: 20,000 lb. (less transmitter and power supply container).

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