

Marconi Small Space Aerials

Communication stations which utilize aerials in the range of 15 ft to 20 ft diameter, have a useful application in military and civil systems. Designs have been evolved for a number of special purpose equipments, for use on land or on board ship. The ground aerials are designed for ease of transportation by air or road and are capable of being put into service quickly at the new location. The shipborne aerials are designed to cater for the extremely arduous duty imposed by the movements of the ship itself in rough seas, and yet still maintain the required accurate tracking of the satellite.

Transportable aerial

FEATURES

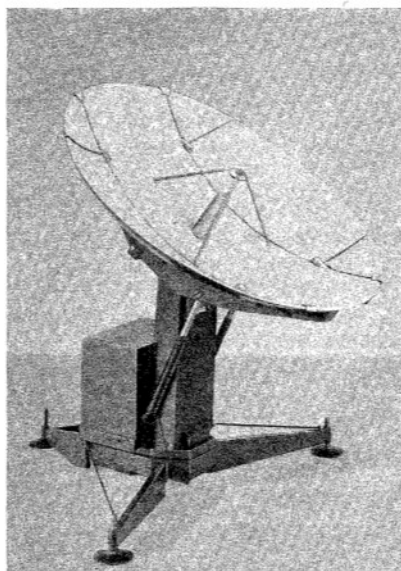
- 20 ft diameter quasi-paraboloid reflector incorporating Cassegrain feed.
- High accuracy surface requiring no adjustment to profile on site.
- Integral feed-horn assembly does not require separation on dismantling.
- Careful design aimed at achieving minimum payload and optimum packaging for transportation by freighter aircraft or helicopter.
- Aerials capable of being erected in 4 hours on arrival at site.
- No external cranes required to erect aerial.

Equipment

The aerial consists of a 20 ft diameter quasi-paraboloid reflector with Cassegrain feed, carried by a fully steerable elevation-over-azimuth mount. The 20 ft diameter reflector is supported on elevation bearings at the top of a 10 ft high support column which in turn is attached to the azimuth turning gear. The turning gear is built at the centre of a supporting framework from which three cantilever stabilizer legs are extended. On the azimuth turntable behind the support column, is the transmitter container. This is approximately 6 ft high \times 6 ft wide \times 4 ft deep with a personnel access door in the rear face and a number of hatches for equipment access in the side. The complete transmitter and power unit therefore rotate in azimuth during operation of the aerial. The external connections for i.f. signals, control and power are fed via a cable banding arrangement in the centre of the azimuth turning gear.

DATA SUMMARY

Aerial reflector diameter: 20 ft.
f/d ratio: 0.315.



P1008

Model of a 20 ft diameter ground station aerial

Azimuth movement: $\pm 200^\circ$.
Elevation movement: -2° to $+92^\circ$.
Aerial pointing accuracy: 0.15° in winds of 45 mph gusting 60 mph.
Tracking velocities: $2^\circ/\text{sec}$ in slew mode.
Wind survival performance: Up to 100 mph.
Weight (aerial): 6,000 lb.

Shipborne aerial

FEATURES

- 15 ft diameter reflector incorporating front feed.
- Profile accuracy of reflector surface better than 0.1 in r.m.s.
- Reflector fabricated from non-corrodable material.
- Specially inclined mount to cater for high velocities, and accelerations due to movement of the ship.

Equipment

The aerial consists of a 15 ft diameter reflector mounted upon a 45° inclined elevation-over-azimuth mount. The reflector is fabricated of glass fibre re-inforced plastic construction and has a fine wire mesh embedded in to the resin surface and this acts as the reflecting medium. It has a profile accuracy of better than 0.1 in. r.m.s and because of its robust construction will

maintain this accuracy during all operational conditions.

DATA SUMMARY

Aerial reflector diameter: 15 ft.
Reflector surface accuracy: 0.1 inches r.m.s.
Azimuth movement: $\pm 110^\circ$ with respect to the stern.
Elevation movement: $+5^\circ$ to $+110^\circ$ with respect to the horizontal.
Mount caters for the following ship motions:
Yaw $\pm 4.5^\circ$ cyclic period 9 seconds.
Pitch $\pm 8^\circ$ cyclic period 5 seconds.
Roll $\pm 14^\circ$ cyclic period 9.5 seconds.
Tracking rates primary axis (azimuth):
Maximum velocity $43^\circ/\text{sec}$.
Maximum acceleration $41^\circ/\text{sec}^2$.
Secondary axis (elevation):
Maximum velocity 17.5° .
Maximum acceleration $21^\circ/\text{sec}^2$.
Pointing accuracy: Better than 10 minutes of arc r.m.s.
Wind performance (operational): 50 knots gusting to 70 knots.
Wind performance (survival): 100 knots with gusts up to 120 knots.
The aerial is capable of being driven to stow in winds of 75 knots.

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