3.7 M Ka-band Antenna System with X-Y axis pedestal

1 Main introduction

With the ability of Ka-band uplink transmit, downlink receive, 3.7 M Antenna has fast acquisition of low-orbit satellites, and stable tracking for satellites.

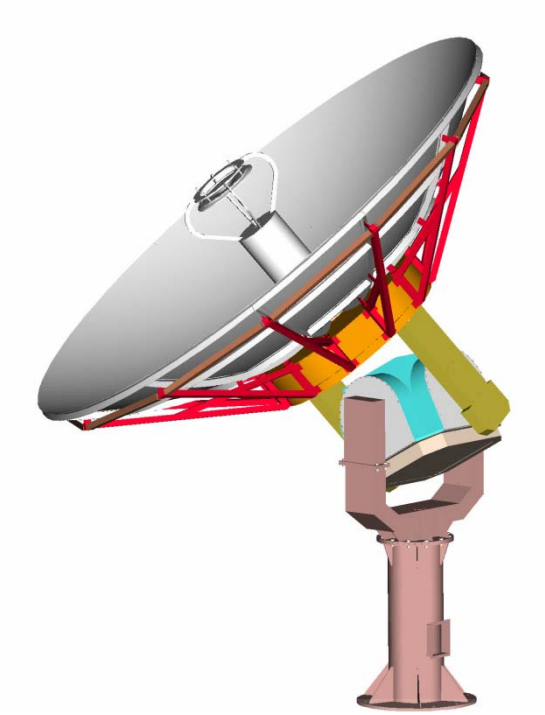

Fig.1-1 3.7 M Antenna

2 Antenna system specification

2.1 Function

1) The tracking ability of satellites in orbit above 5 degrees in the visible arc.
2) The duplex capability of transmission and reception for Ka-band feed signal and left and right rotation circular polarization work simultaneously
3) The ability of auto-tracking for stable tracking of on-orbit targets
4) The function of receiving low noise amplification channel and frequency conversion
5) Monitor network interface and support upper monitoring operation
6) With standby, pointing, manual control, automatic tracking, program tracking and other working methods

7) With stow automatically ability
8) Left and right rotation polarization of tracking channel can be automatically switched
9) The antenna is equipped with a safety protection device to ensure human, machine and environmental safety during operation.

2.2 Mechanical Specification

a) Diameter: ≥3.5m
b) Antenna Pedestal Type: X-Y Axis Pedestal
c) Main Surface Accuracy: 0.3mm（RMS）。
d) Rotary range:
   1) X Axis: -90°~+90°
   2) Y Axis: -90°~+90°

2.3 Electrical Specification

a) Ka Operating Frequency：
   1) Ka Tx.: 27.5GHz~30GHz
   2) Ka Rx.: 17.7GHz~20.2GHz
b) Gain
   1) Ka Tx.: ≥56.5+20lg(f/28.75GHz) dB
   2) Ka Rx.: ≥52.8+20lg(f/18.95GHz) dB
c) G/T Value (El ＞ 10°Temperature 23°C , Sunny day) ≥28.2+20lg(f/18.95GHz) dB/K
d) Antenna pattern envelope
   1) First Sidelobe: -14dB
   2) Wide-angle sidelobe (peak value of 90°）
      ≤29-25lgθ dBi （1°≤θ≤20°）
      ≤32-25lgθ dBi （20°＜θ≤48°）
e) VSWR: ≤1.5:1
f) Polarization: L&R Circular Polarization

g) Circular polarization axis ratio: ≤1.0dB

h) Port：Tx. 2 Rx. 2

i) Interface type

1) Tx.: WR-34 wave guide

2) Rx.: WR-42 wave guide

2.4 Servo drive ability

a) Antenna control mode: standby, pointing, manual control, program tracking, automatic tracking, stow

b) X Y axis rotation speed: 0.01~5°/s。

c) Antenna pointing accuracy: better than 1/6 times antenna main lobe half power beamwidth.

d) Antenna tracking system: single channel single pulse automatic tracking.

e) Antenna tracking accuracy: better than 1/8 times antenna main blade half power beam width.

2.5 Environmental specification

a) Temperature: -40℃~+55℃

b) Relative Humidity: 0~100% No condensation

c) Wind Load

1) Operational: Steady-state 8-level wind (20.7m/s), transient 10-level wind (27.6m/s)

2) Survival：12-level wind (35m/s)