Balloon TDRSS Antennas

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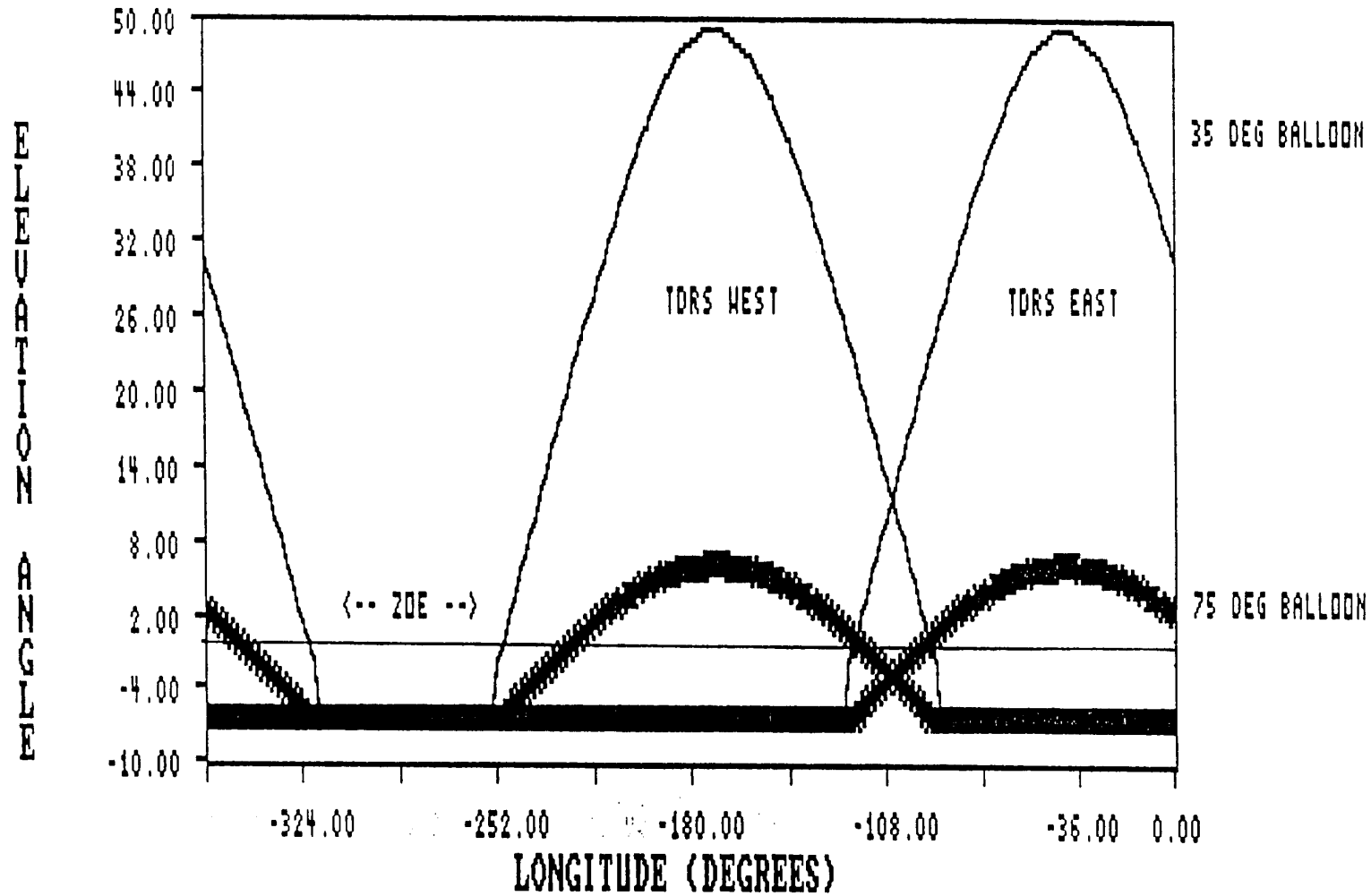
GSFC Code 531.2

TDRS POSITION FOR THE BALLOON



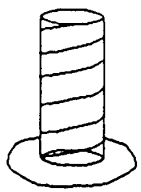
BALLOON HEIGHT = 120,000 FT

CANDIDATE S-BAND BALLOON ANTENNAS

MID - LATITUDE

LOW GAIN

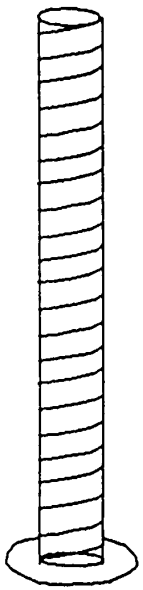
0 - 2 Dbi



POLAR

MEDIUM GAIN

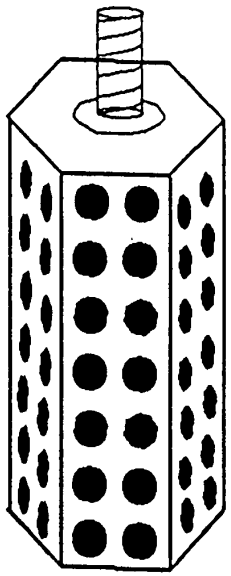
5 Dbi



QUADRIFILAR HELIX

HIGH GAIN

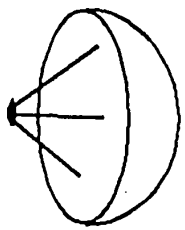
15 Dbi



SWITCHABLE ARRAY

HIGH GAIN

20 dbi

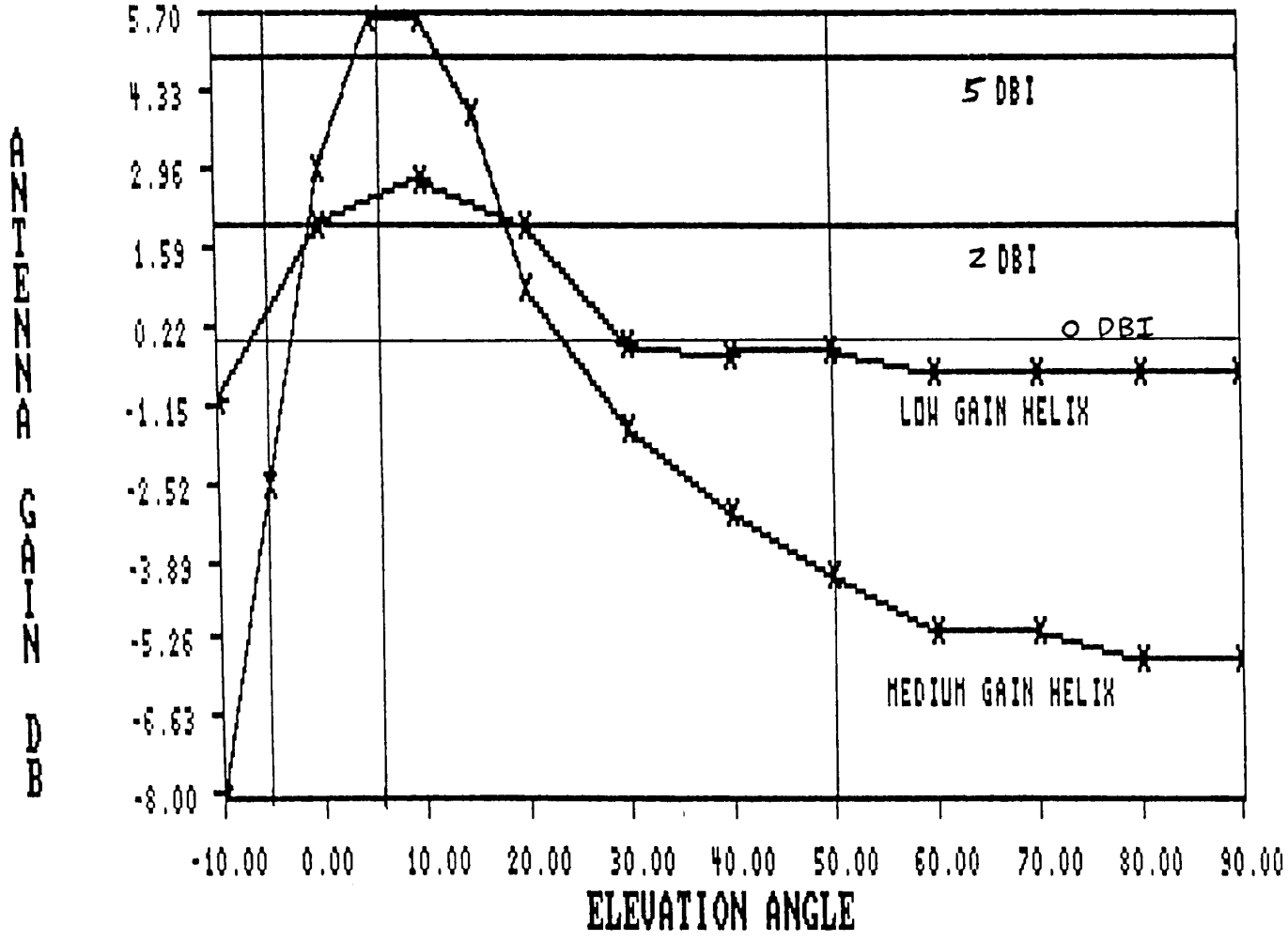


2 FT DISH

Balloon Quadrifilar Helix Antennas

- Omnidirectional in azimuth
- Optimized for TDRS position in the sky
- High Latitude (Polar) Antenna
  - Peak gain 5 dBi, 2dBi over coverage area
- Mid Latitude Antenna
  - Peak Gain 2 dBi, 0 dBi over coverage area

QUADRIFILAR HELIX ANTENNA



Gimbaled S-Band Antenna System

- KVH low cost pedestal:
  - Commercial unit designed for mobile satellite telephone service on marine based platforms
  - Digital Gyro Compass / Inclinometer compensation of platform motion
- Seavy 14 dB gain S-Band planar array antenna
- Antenna System currently being evaluated at the RF Simulations Operations Center (RF SOC)

Transponder/Antenna System vs. TDRS Service - Comparative Analysis

Transponder/ Antenna Description	Balloon Transponder with Mid-Latitude Quad Helix Antenna	Balloon Transponder with High-Latitude Quad Helix Antenna	Balloon Transponder with Seavey/KVH Antenna-Pedestal
Antenna Gain	0 dB	3 dB	14.6 dB

Forward Link (note 2)			
SSA (Kbps)	3.60	7.20	93.00
SMA (Kbps)	0.40	0.79	10.20

Return Link									
Power (Watts)	5	15	25	5	15	25	5	15	25
SSA (Kbps)	13.3	50.0	83.8	33.3	99.8	167.1	429.5	1282.3	2142.9
SMA (Kbps)	2.3	6.7	11.3	4.5	13.5	22.5	57.9	100.0	100.0

Notes:

1. All results obtained via baseline CLASS parameters.
2. The Forward Link will support data rates greater than those listed but is limited by the transponder to the following rates: 125, 250, 500,1000, 4000, 12000 and 24000 bps.
3. MA Return Link data rates are limited to 100 Kbps by the TDRS System.