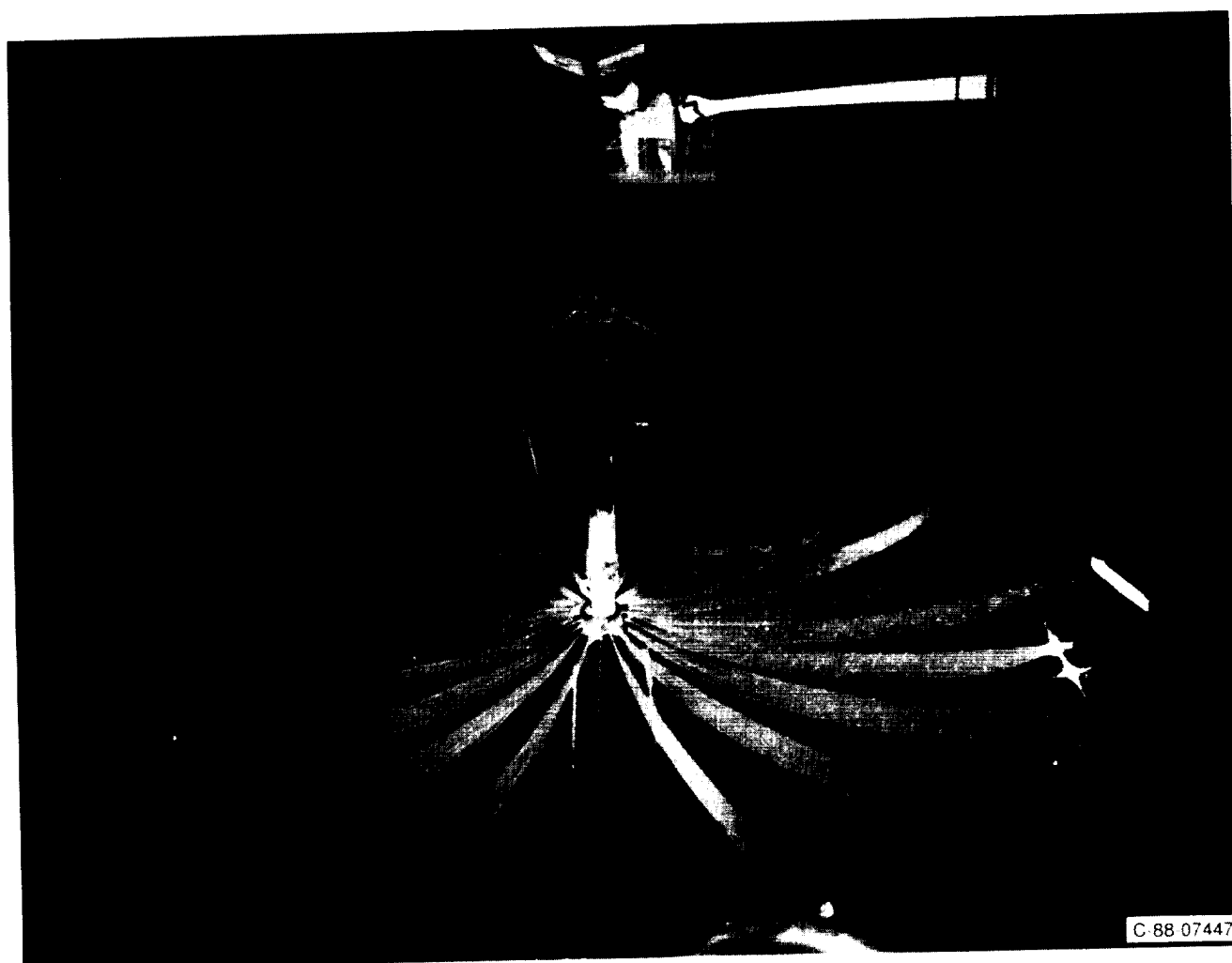


N90-21798

LARGE SPACE SYSTEMS ANTENNA TECHNOLOGY

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ORIGINAL PAGE
BLACK AND WHITE PHOTOGRAPH

LESSONS LEARNED

- Build accuracy off by factor-of-two.
- Manual adjustment better than spec.
- Finite element model development.
- Antenna pattern calculations OK with notable exceptions.
- Surface RMS – sidelobe relation.
- Near field diagnostics.

CSEI
PROGRAM OBJECTIVE

Develop Large Space Antenna Technology

For Optimizing RF Performance

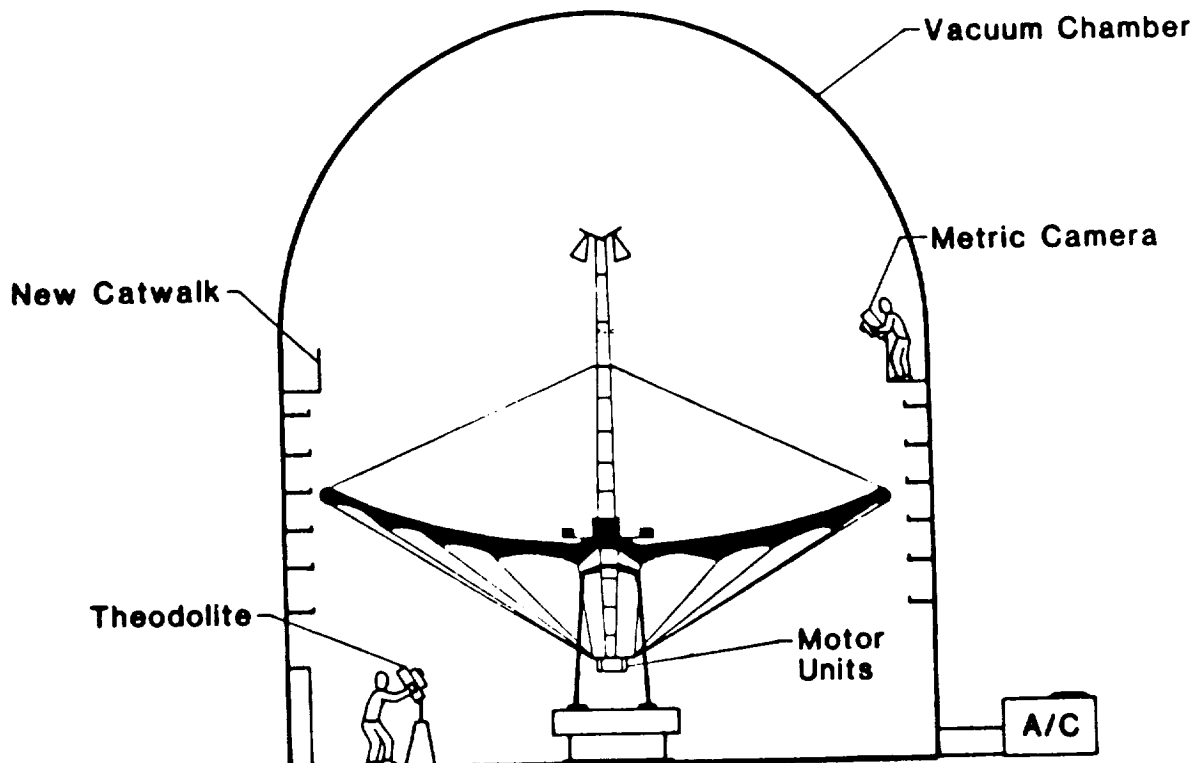
Using An Interdisciplinary Approach.

APPROACH

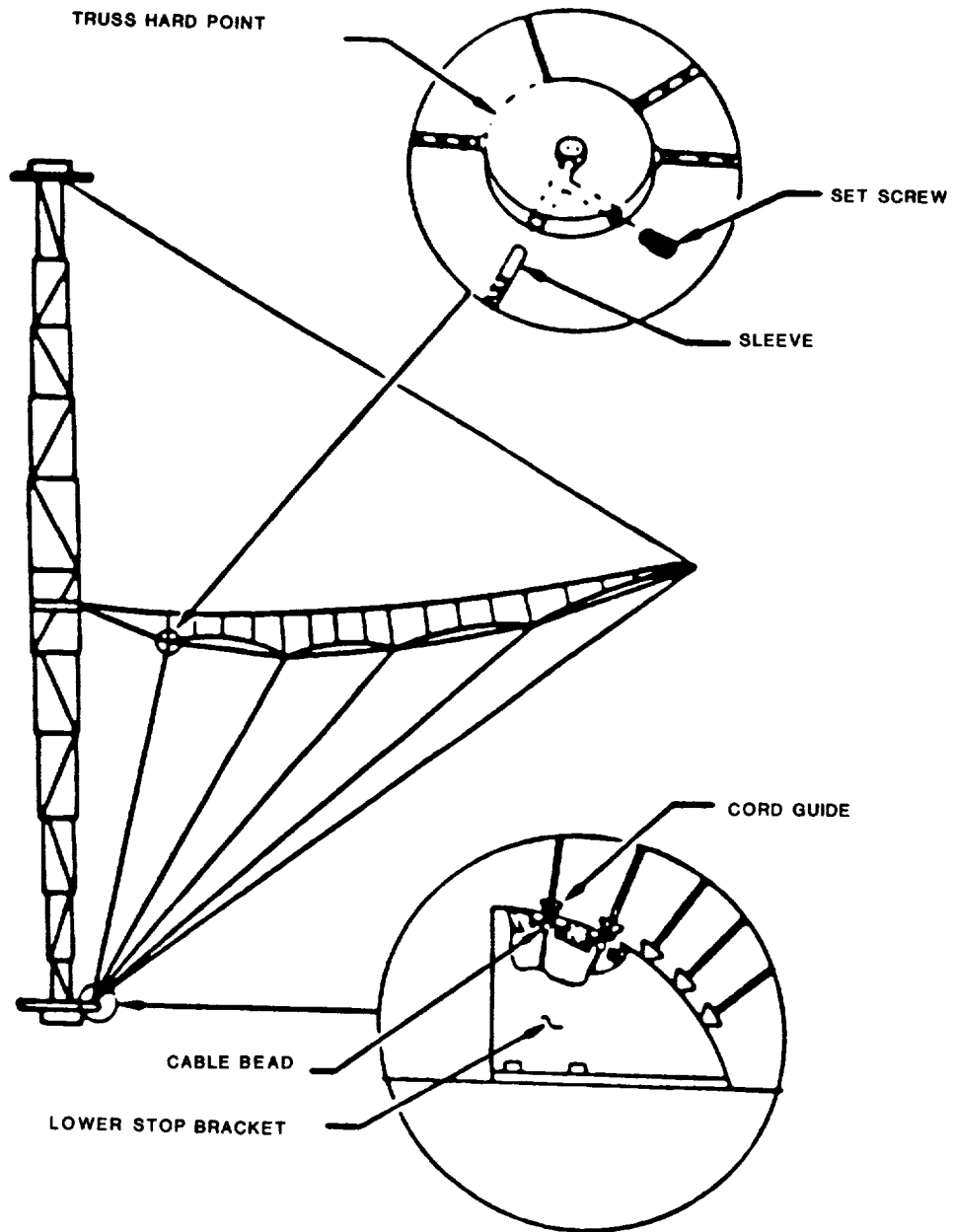
EXTEND 15-METER ANTENNA TESTS TO INCLUDE:

- Surface Control For Reflector Figure Improvement
- Adaptive Feed Techniques For Surface Distortion Compensation
- Integrated Experiments
 - Structural Dynamics
 - Electromagnetics
 - Controls
- Real Time Figure Measurements

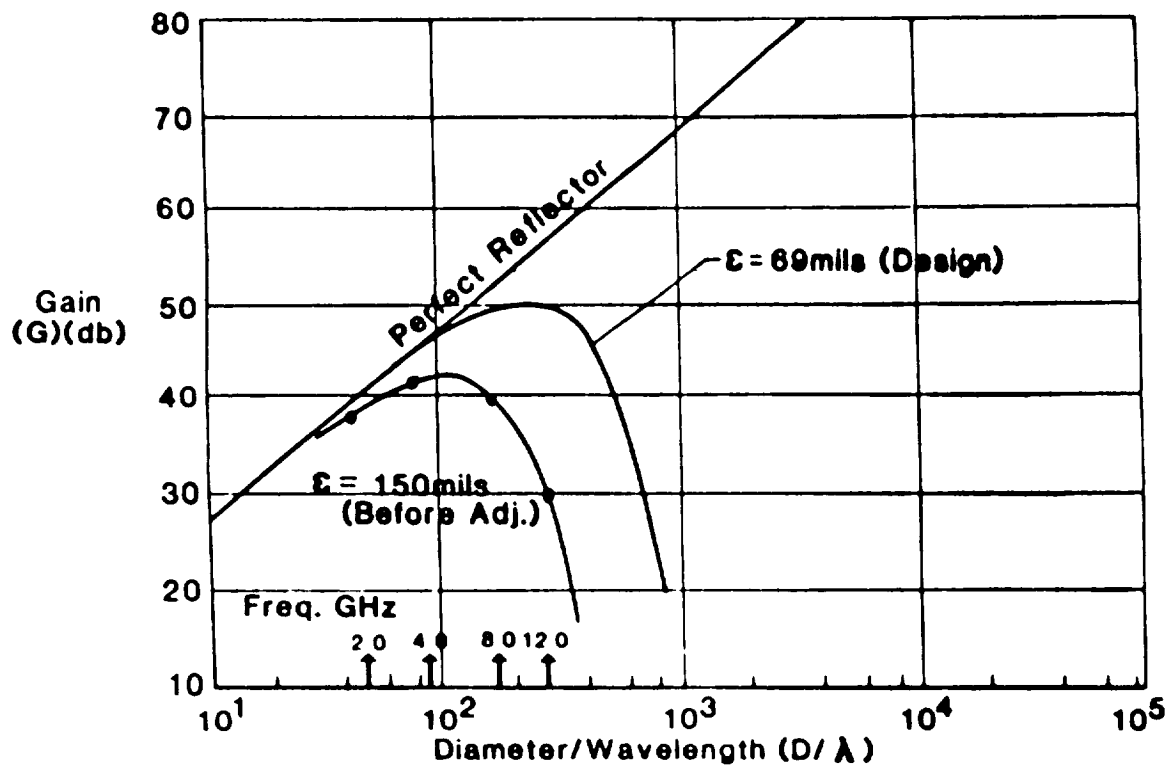
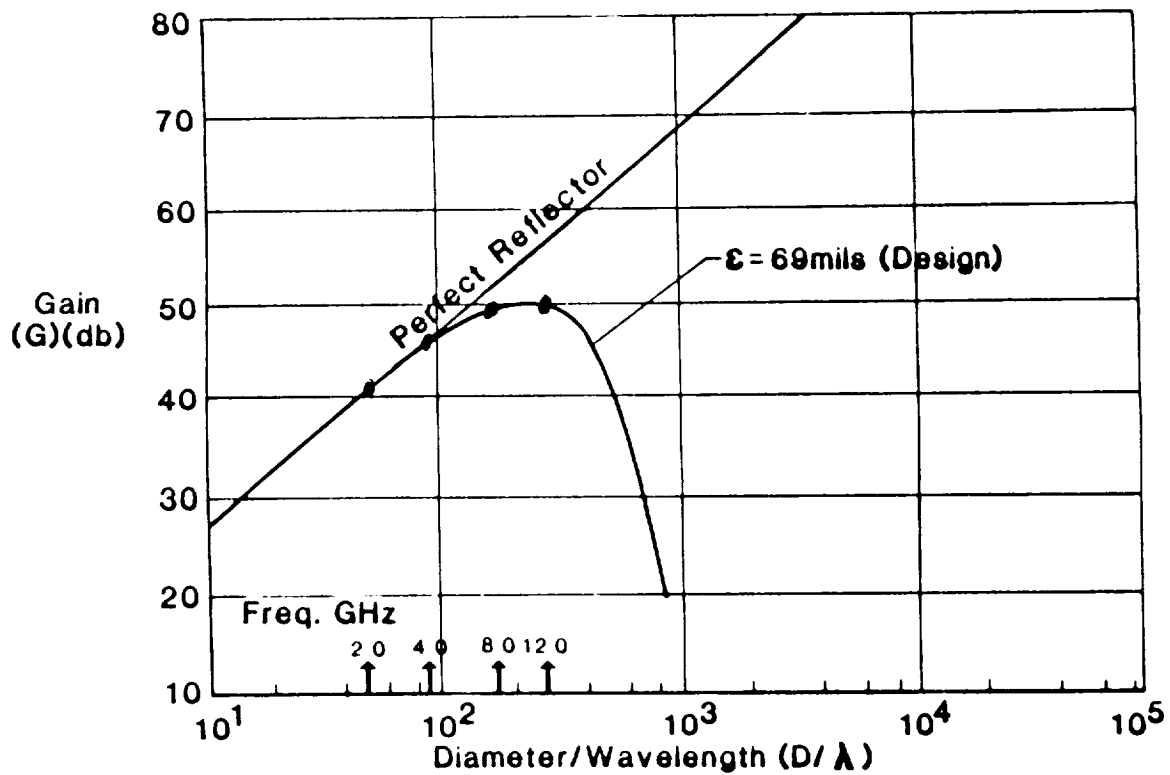
PHASE I TEST FACILITY (Bldg. 1293B)



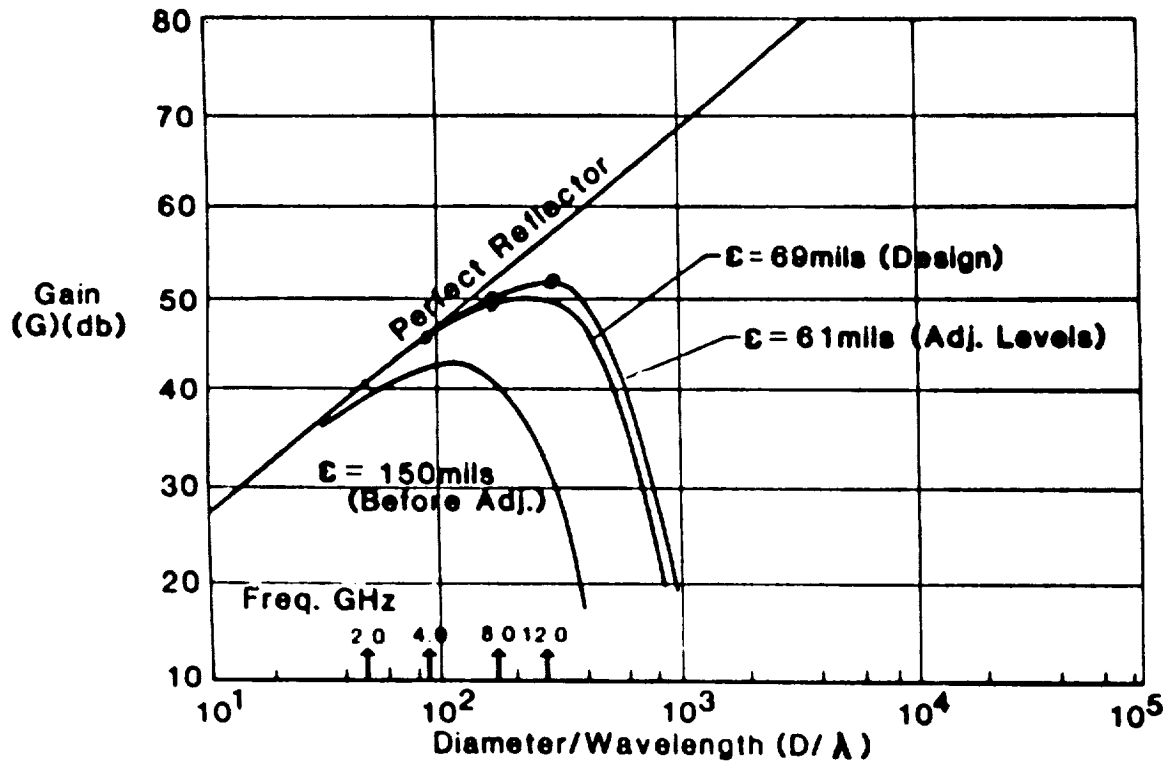
SURFACE CONTROL CORDS



WHAT FREQUENCIES TO USE

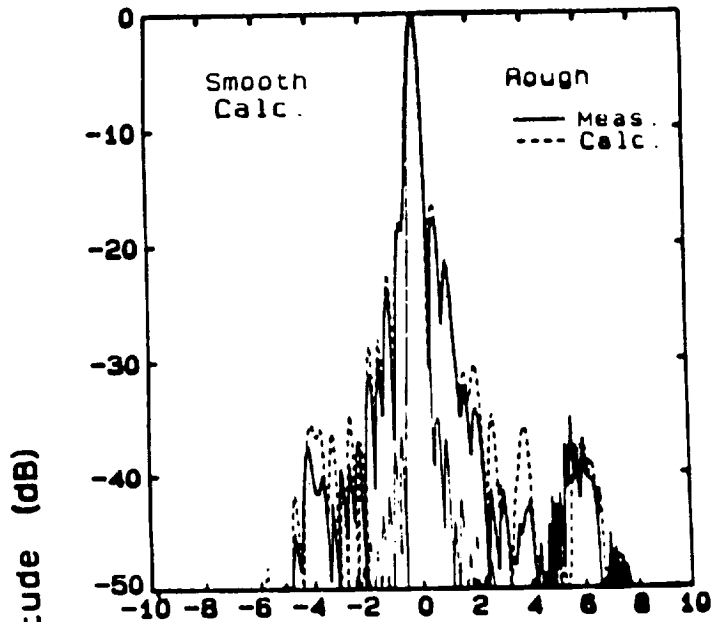


WHAT FREQUENCIES TO USE

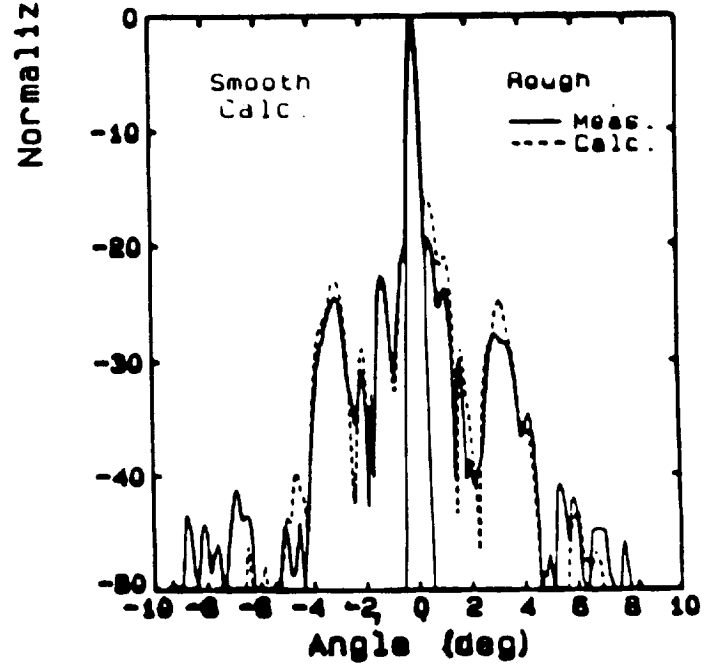


RADIATION PATTERNS FOR HOOP/COLUMN REFLECTOR ANTENNA

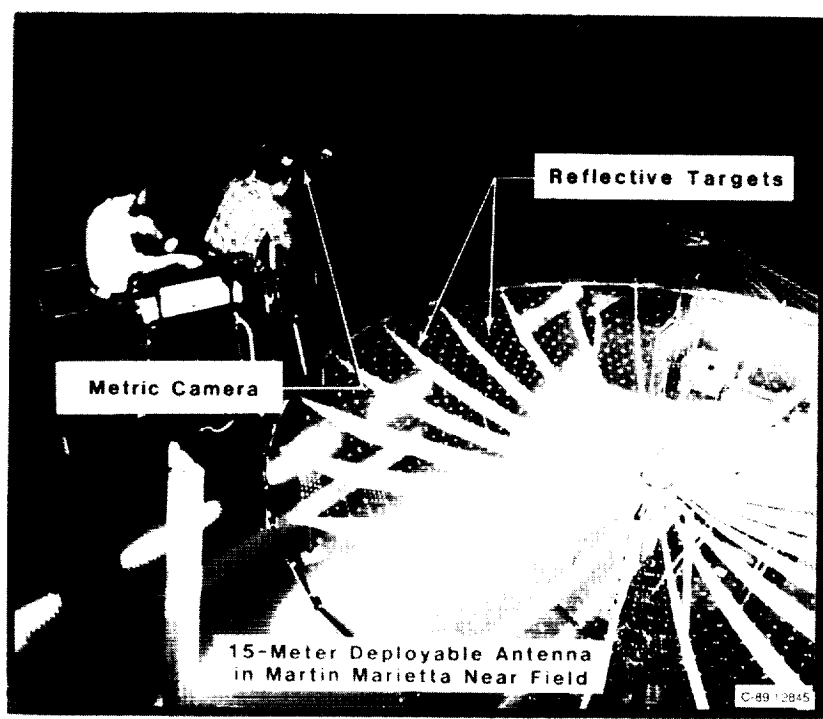
E-PLANE (11.6 GHz)



H-PLANE (11.6 GHz)

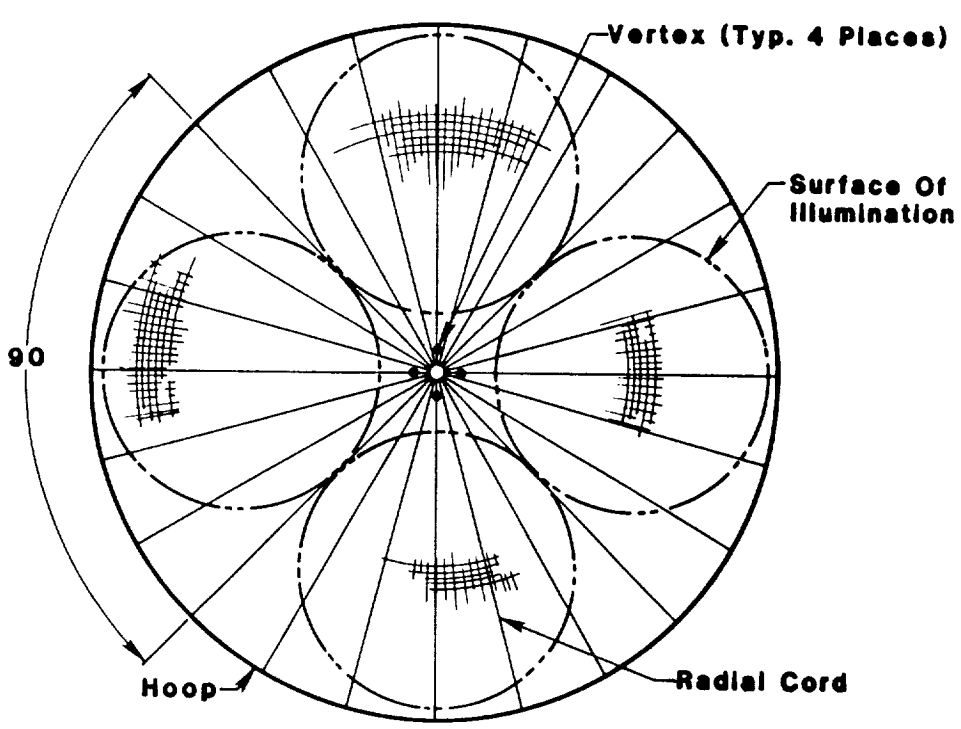


SURFACE CHARACTERIZATION OF LARGE SCALE ANTENNAS

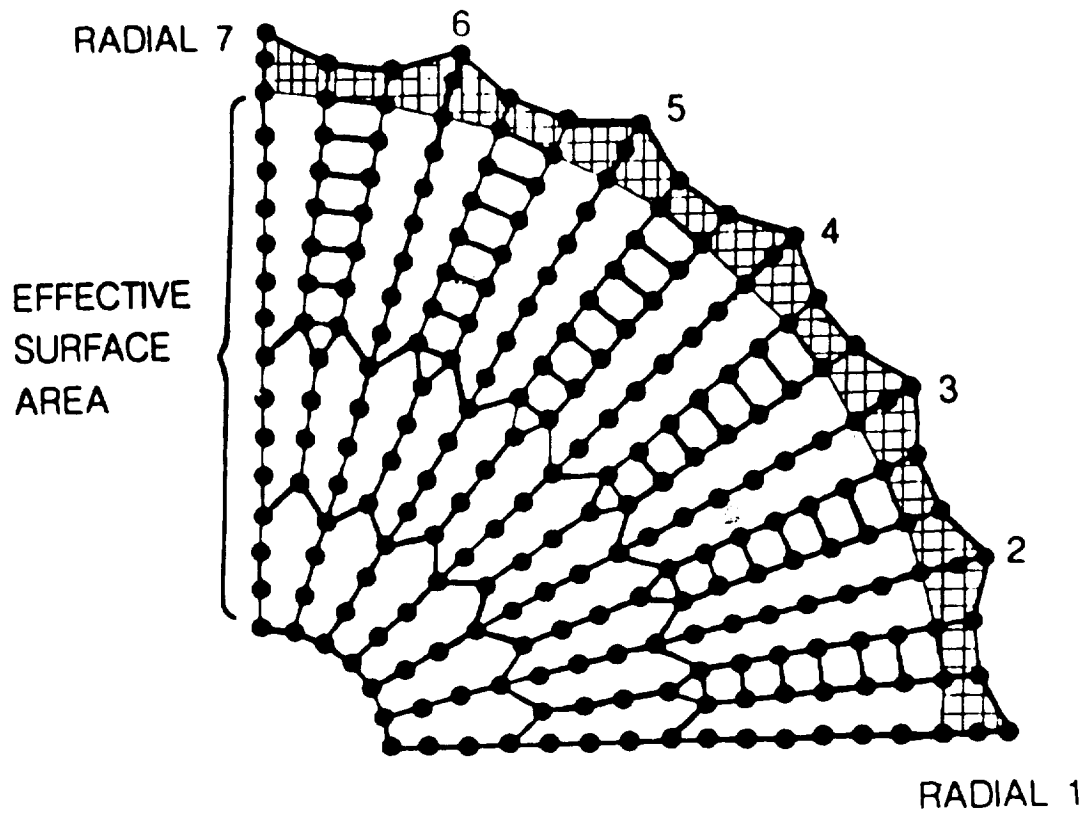


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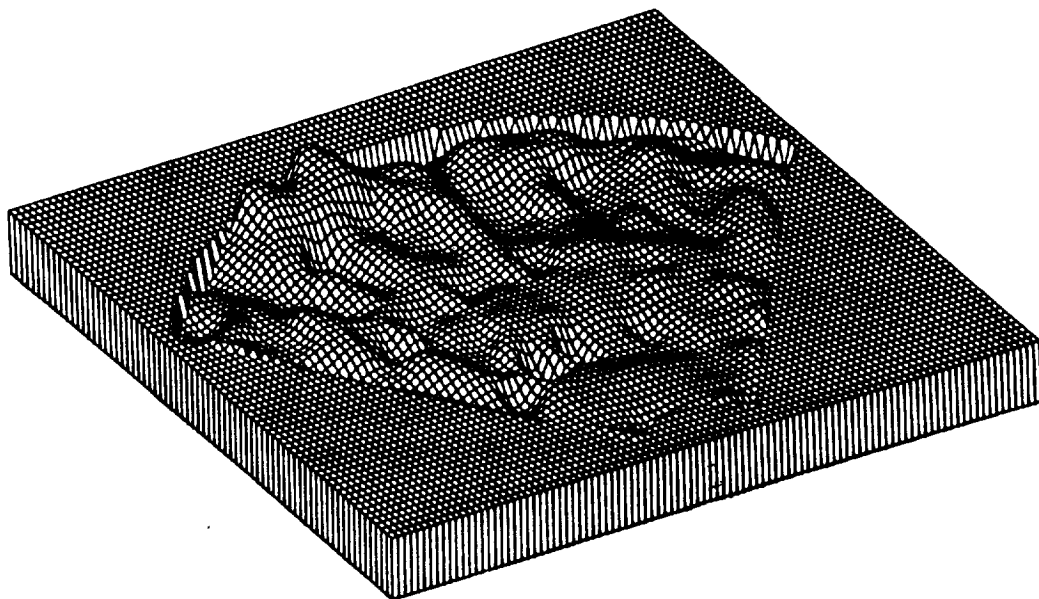
SURFACE-PLAN VIEW

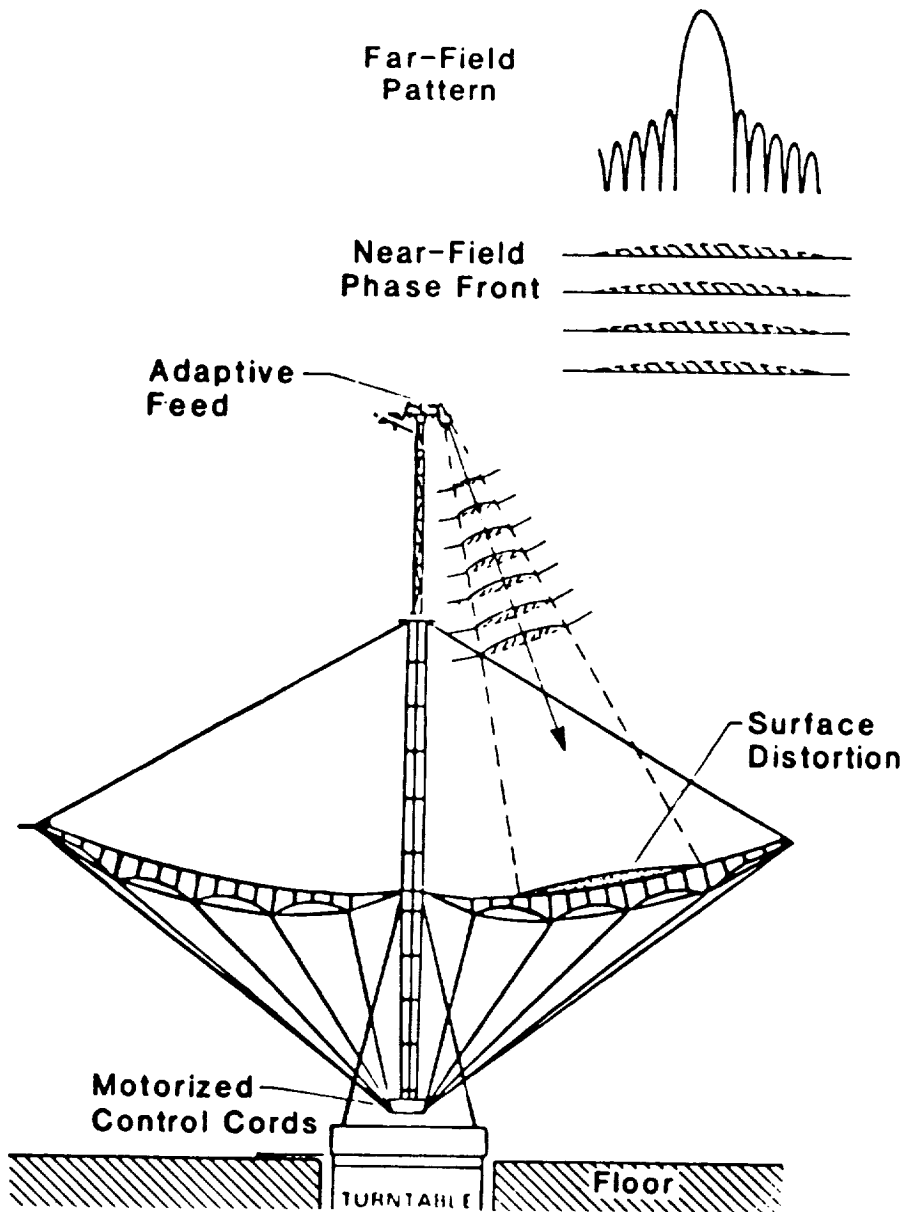


Antenna Surface Target Locations

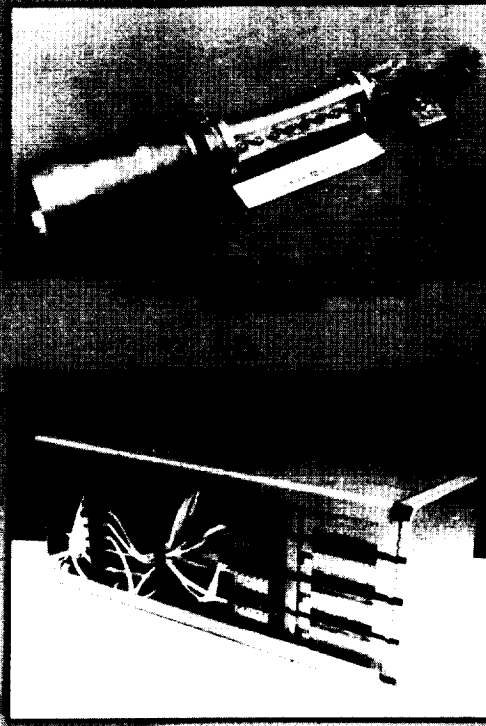


QUADRANT 4 SURFACE SHAPE (Tie points only)





ADAPTIVE FEED MULTIMODE HORN & ARRAY CONFIGURATION



RESPONSIVE NETWORK ASSEMBLY

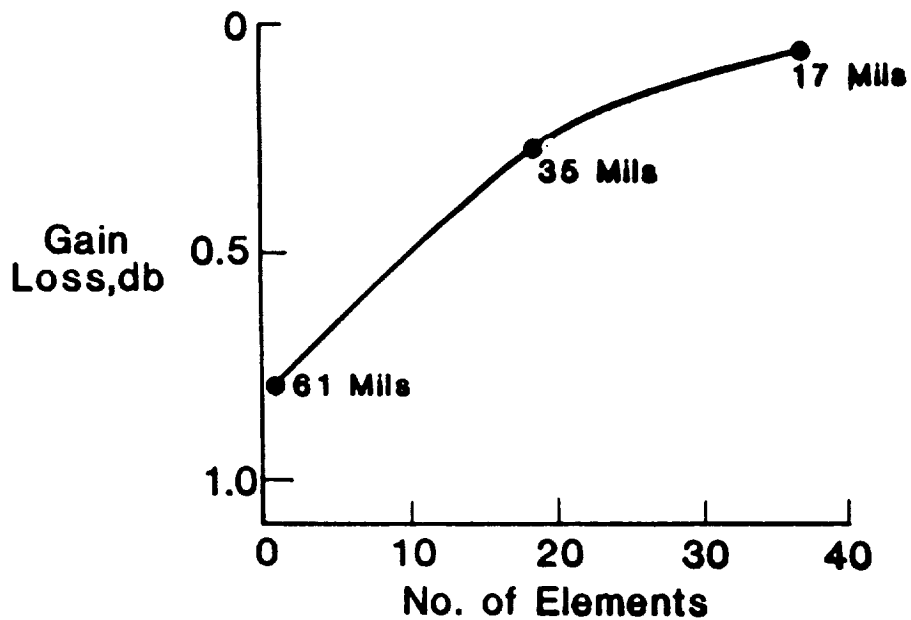


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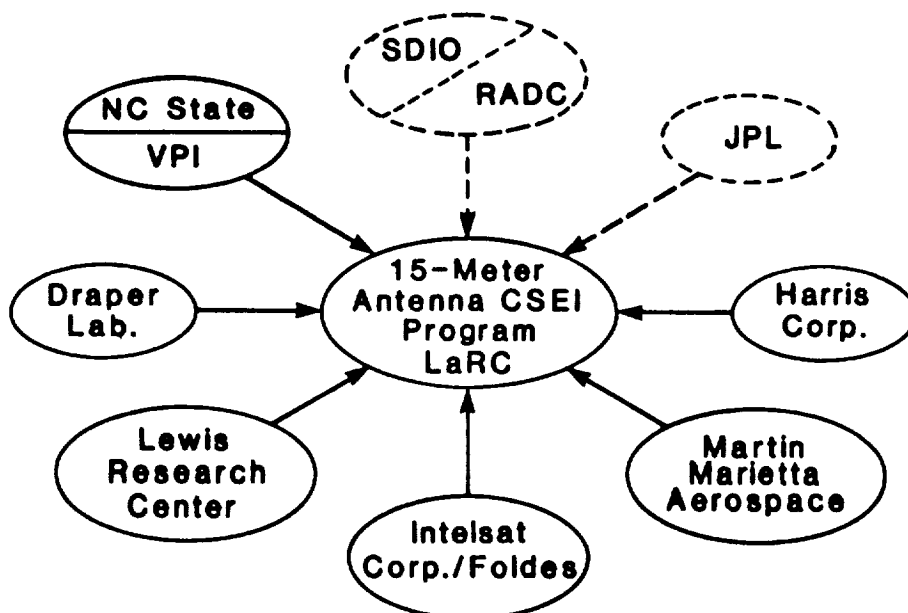
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ADAPTIVE FEED COMPENSATION

C-BAND



CSEI OUTSIDE PARTICIPANTS



TECHNOLOGY BENEFITS OF CSEI PROGRAM

- **Expand RF Performance Data Base on Large Space Antennas**
- **Obtain Accurate Evaluation Of Interdisciplinary Analytical Codes**
- **Development of Surface Control & Adaptive Feed Concepts**
- **Verification of Design Methodology for Optimizing RF Performance for Large Aperture Systems**

