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LARGE SPACE SYSTEMS ANTENNA TECHNOLOGY

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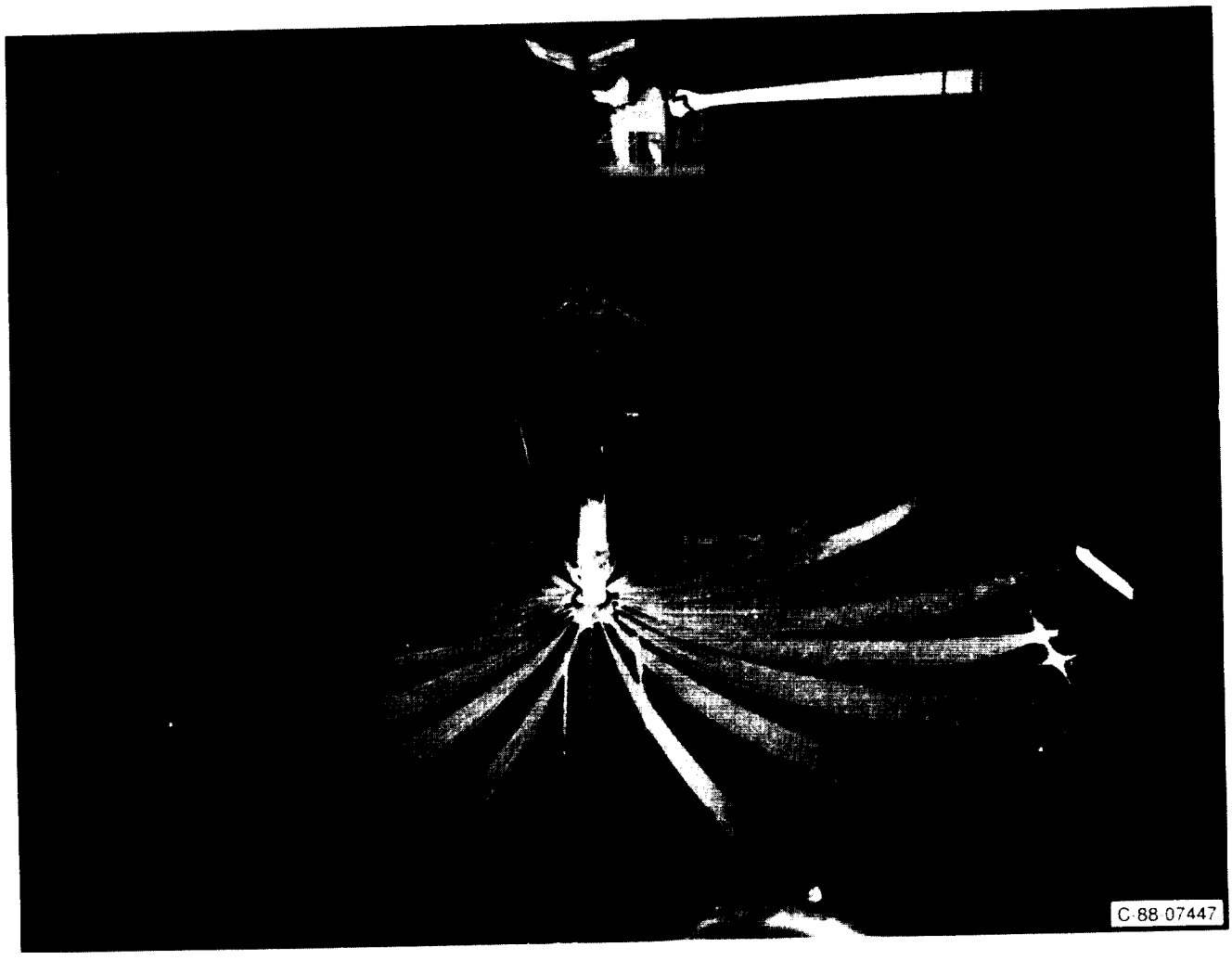

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LESSONS LEARNED

- 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

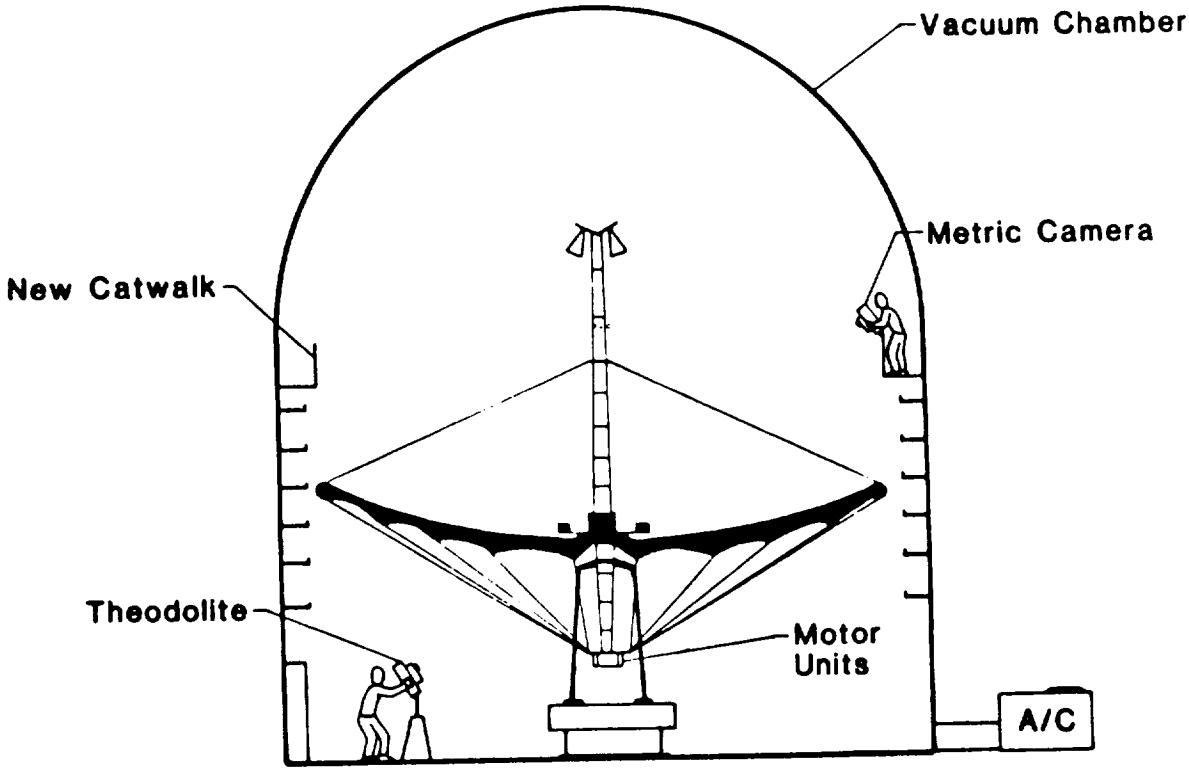
Using An Interdisciplinary Approach.

APPROACH

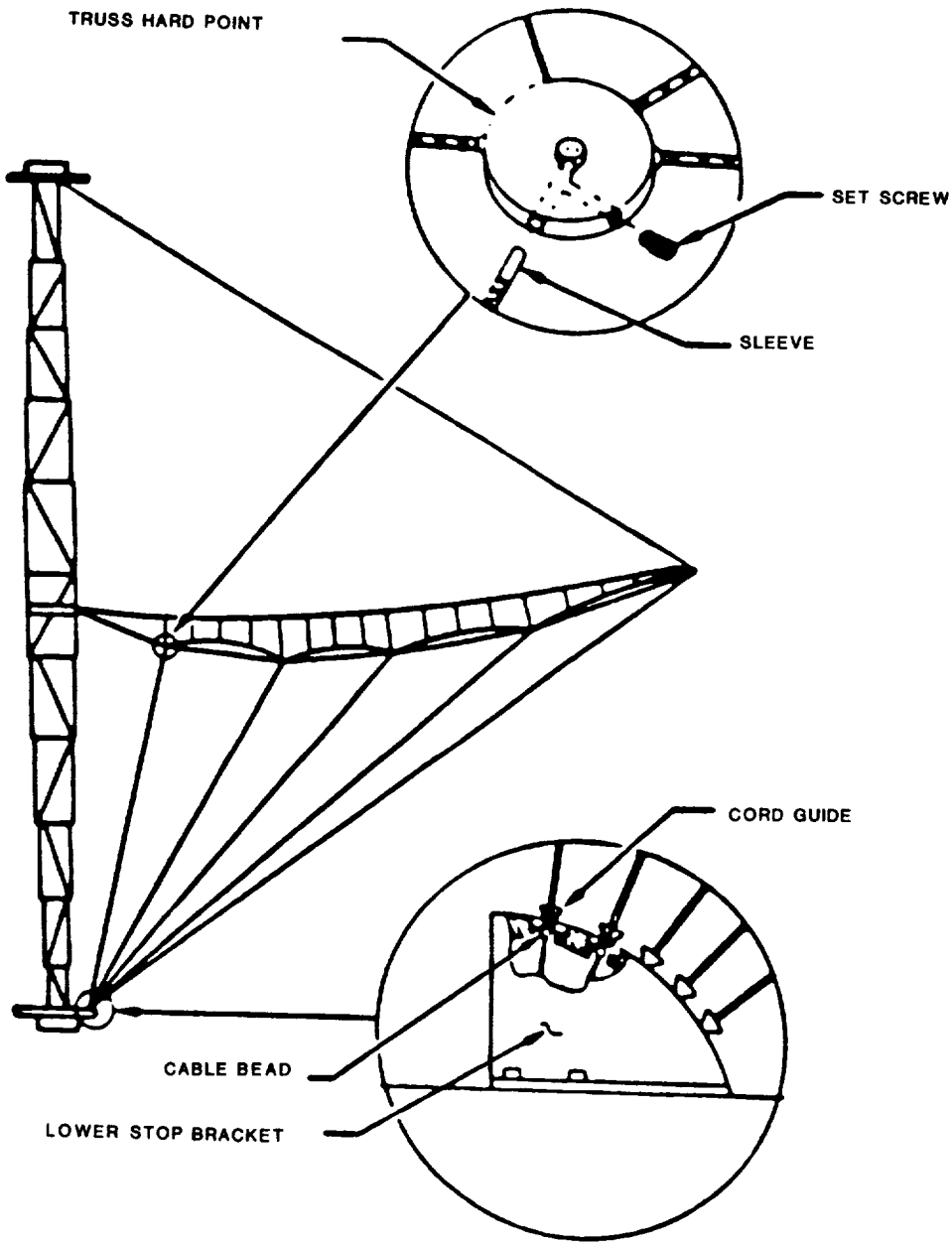
EXTEND 15-METER ANTENNA TESTS TO INCLUDE:

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

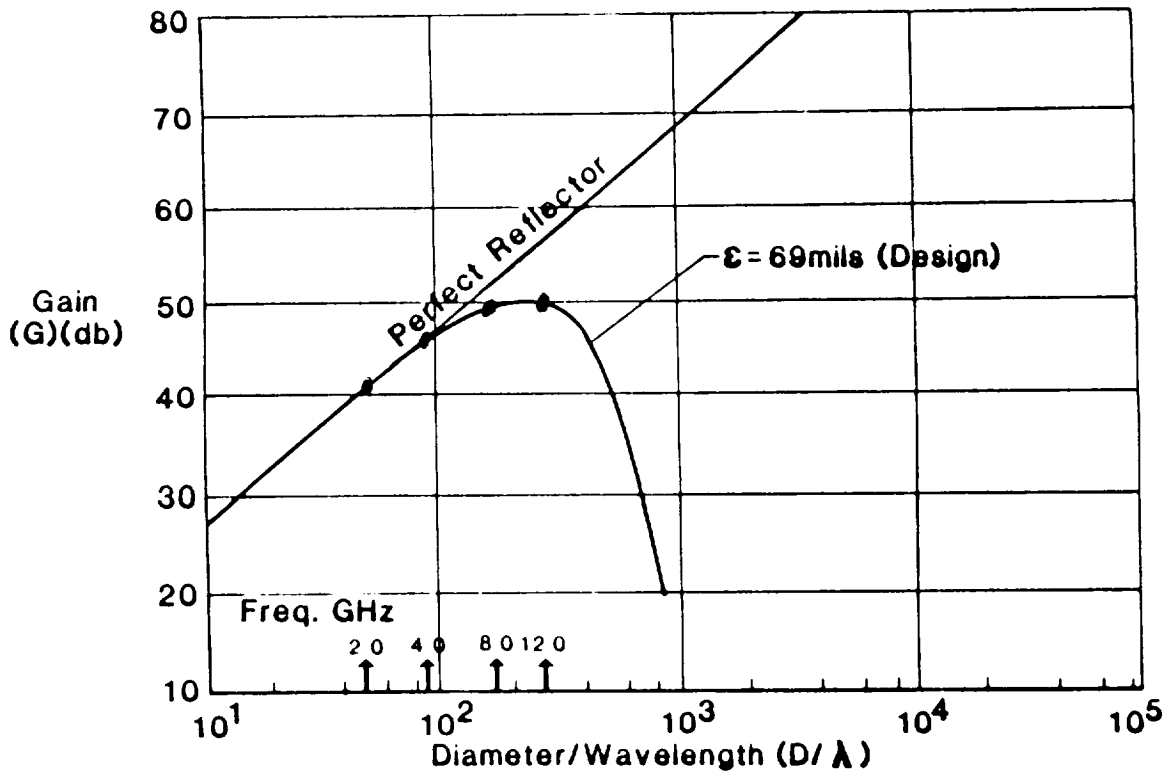
PHASE I TEST FACILITY (Bldg. 1293B)

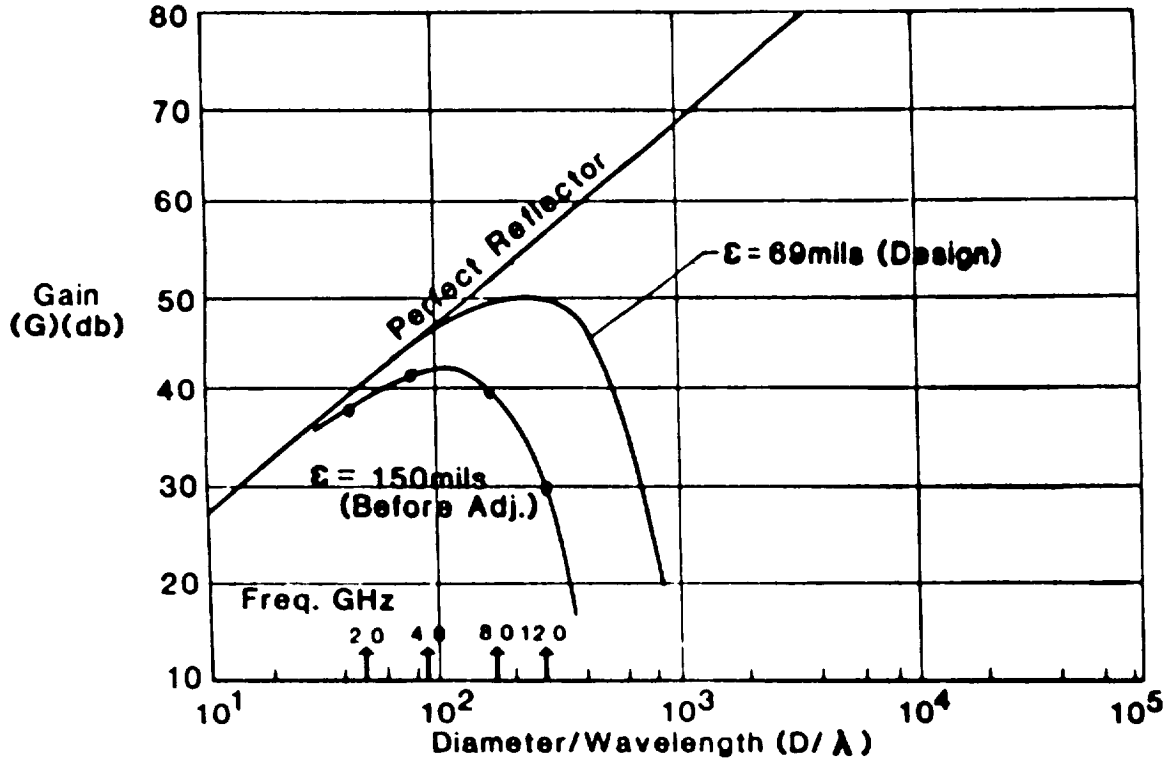


SURFACE CONTROL CORDS



WHAT FREQUENCIES TO USE





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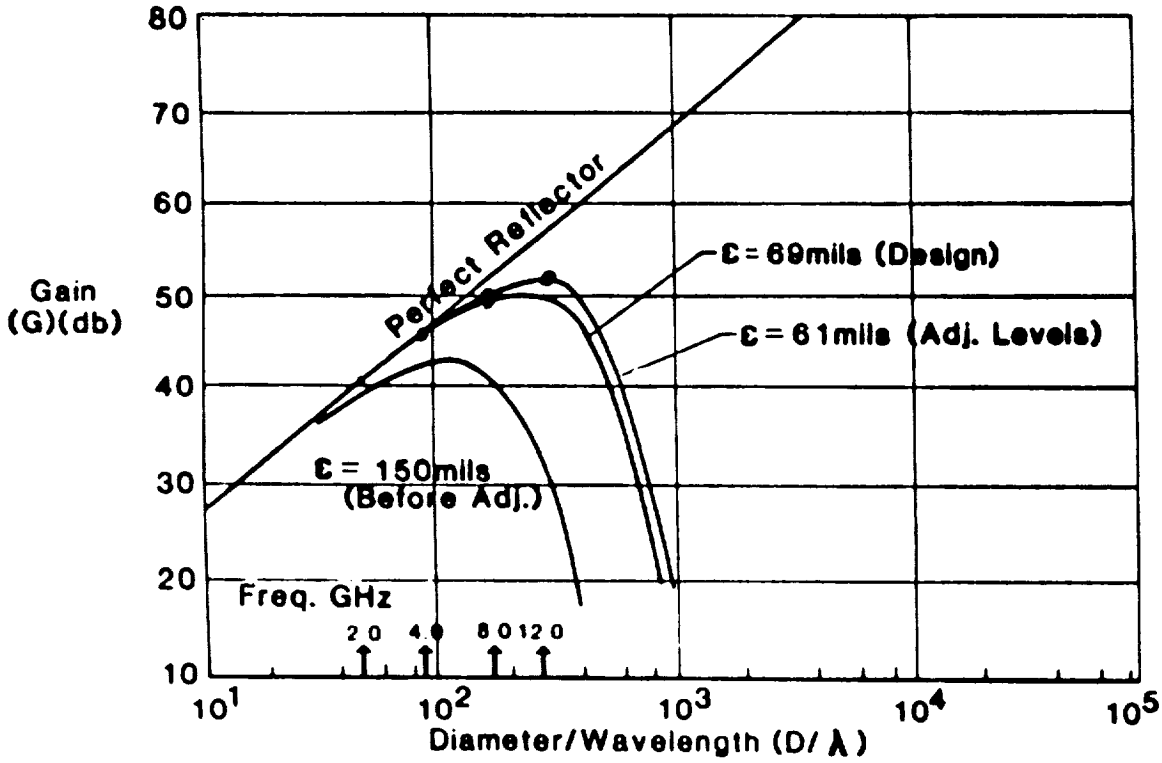
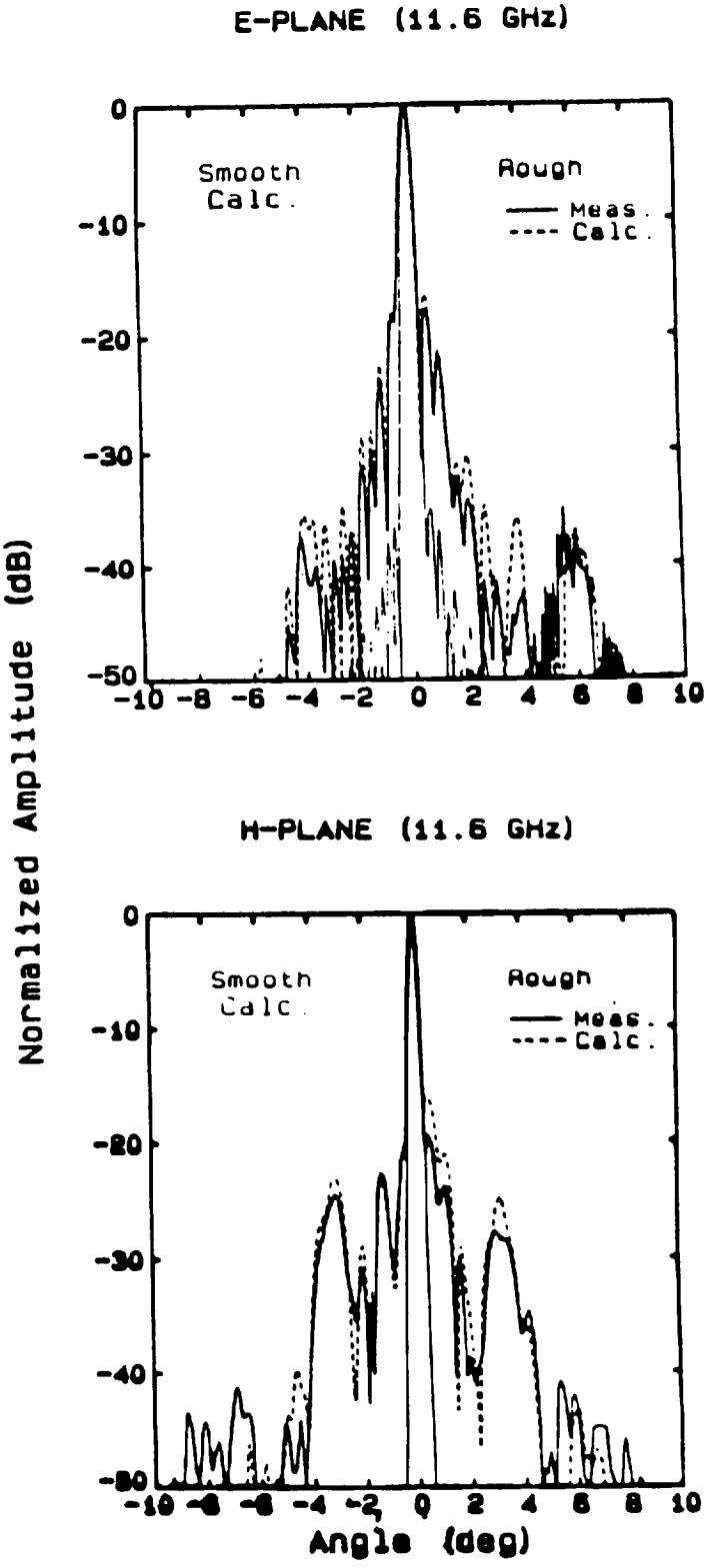
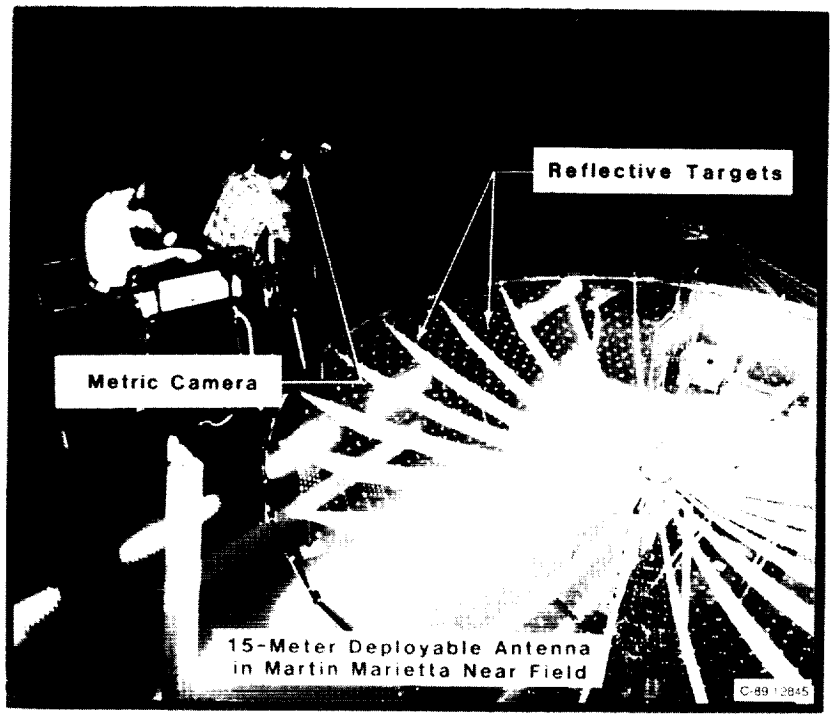


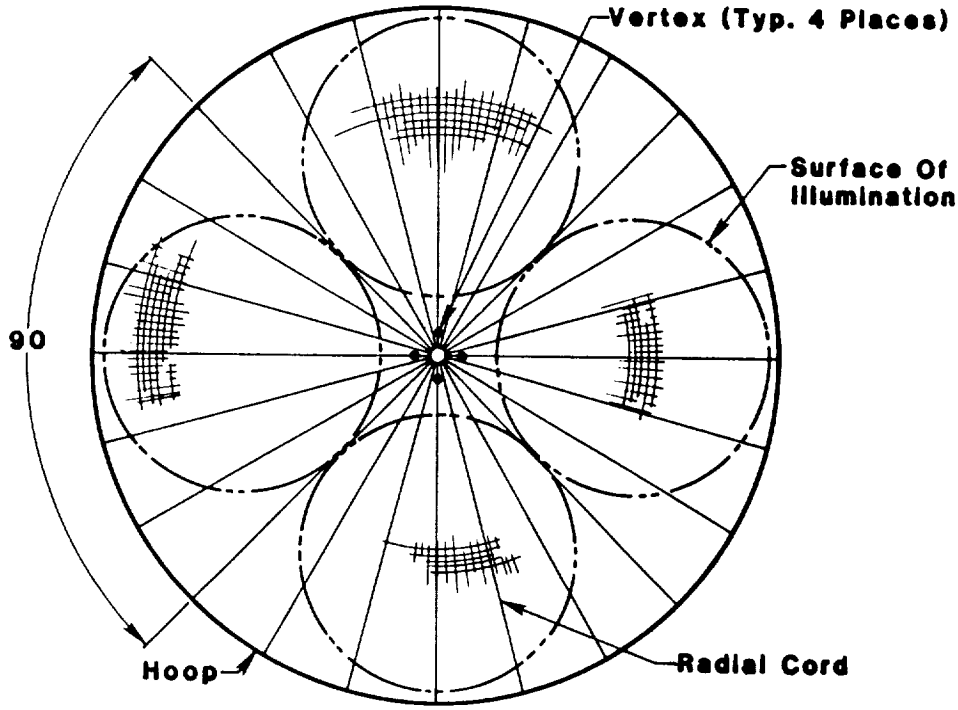
RADIATION PATTERNS FOR HOOP/COLUMN REFLECTOR ANTENNA



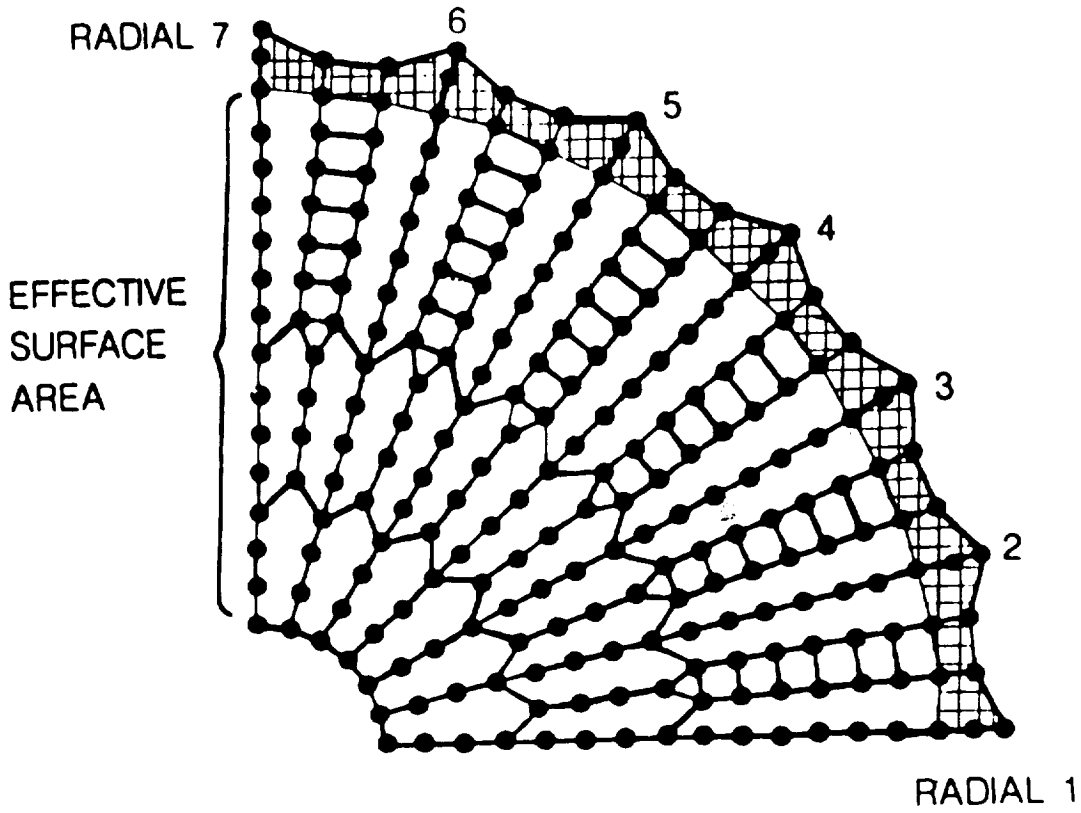
SURFACE CHARACTERIZATION OF LARGE SCALE ANTENNAS



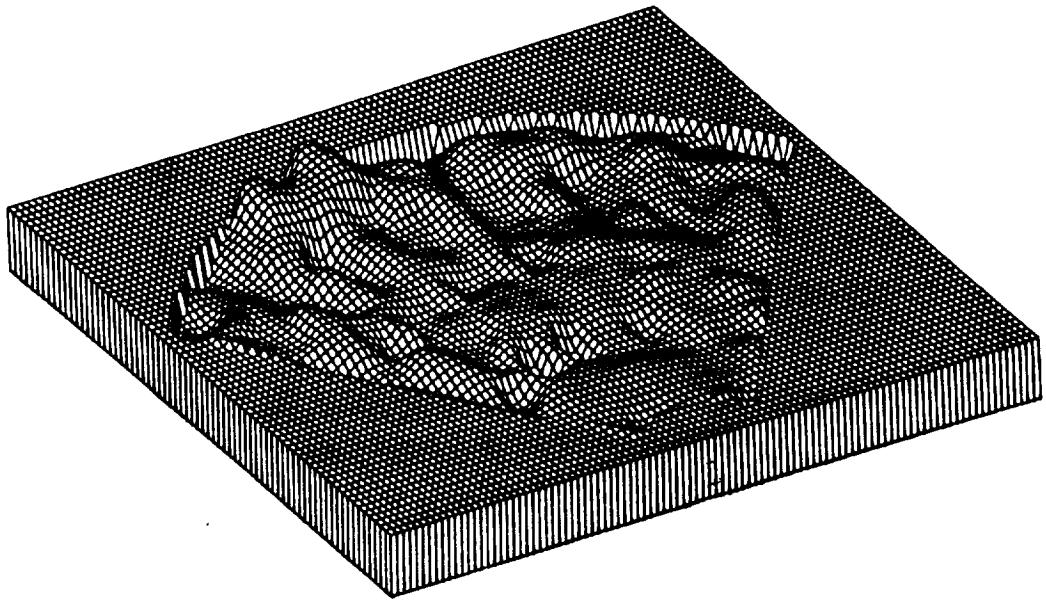
SURFACE-PLAN VIEW

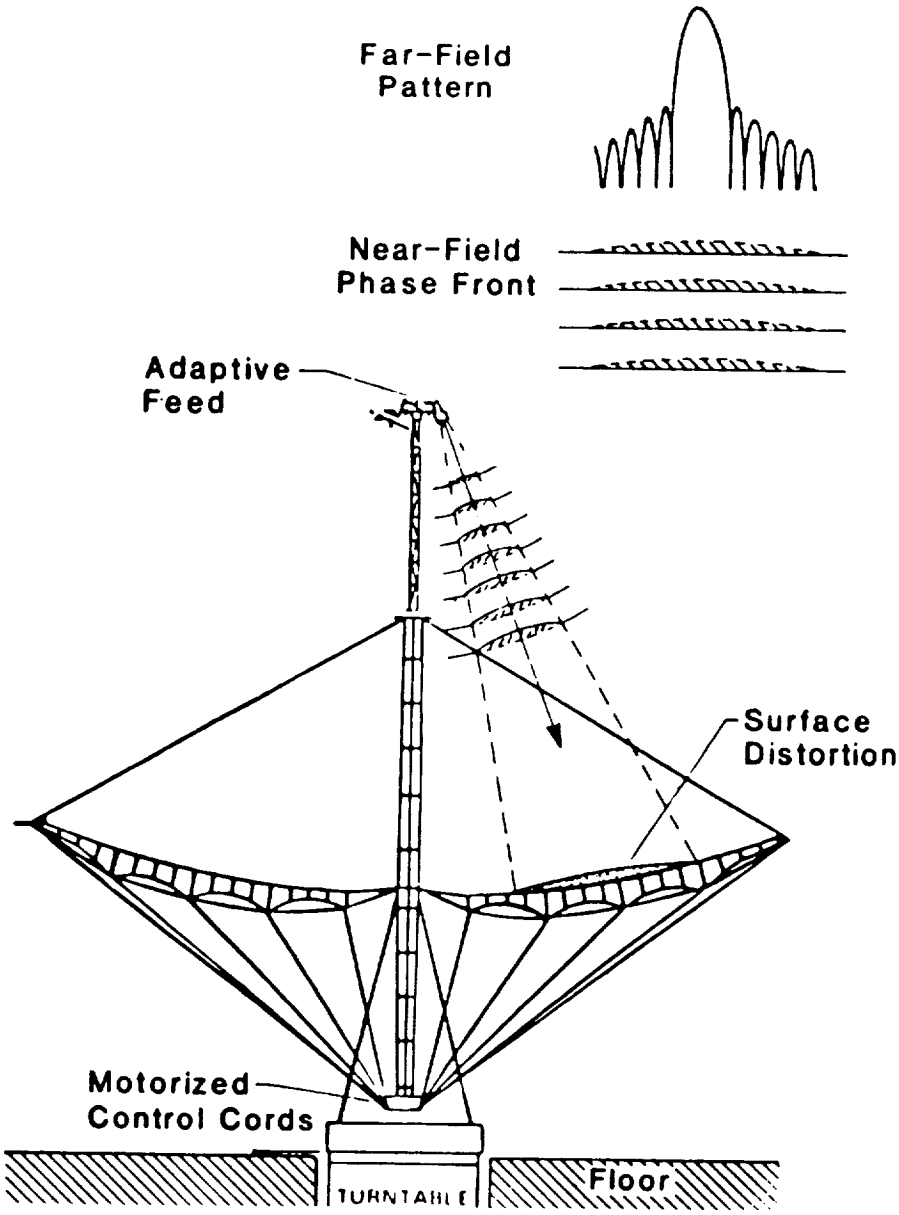


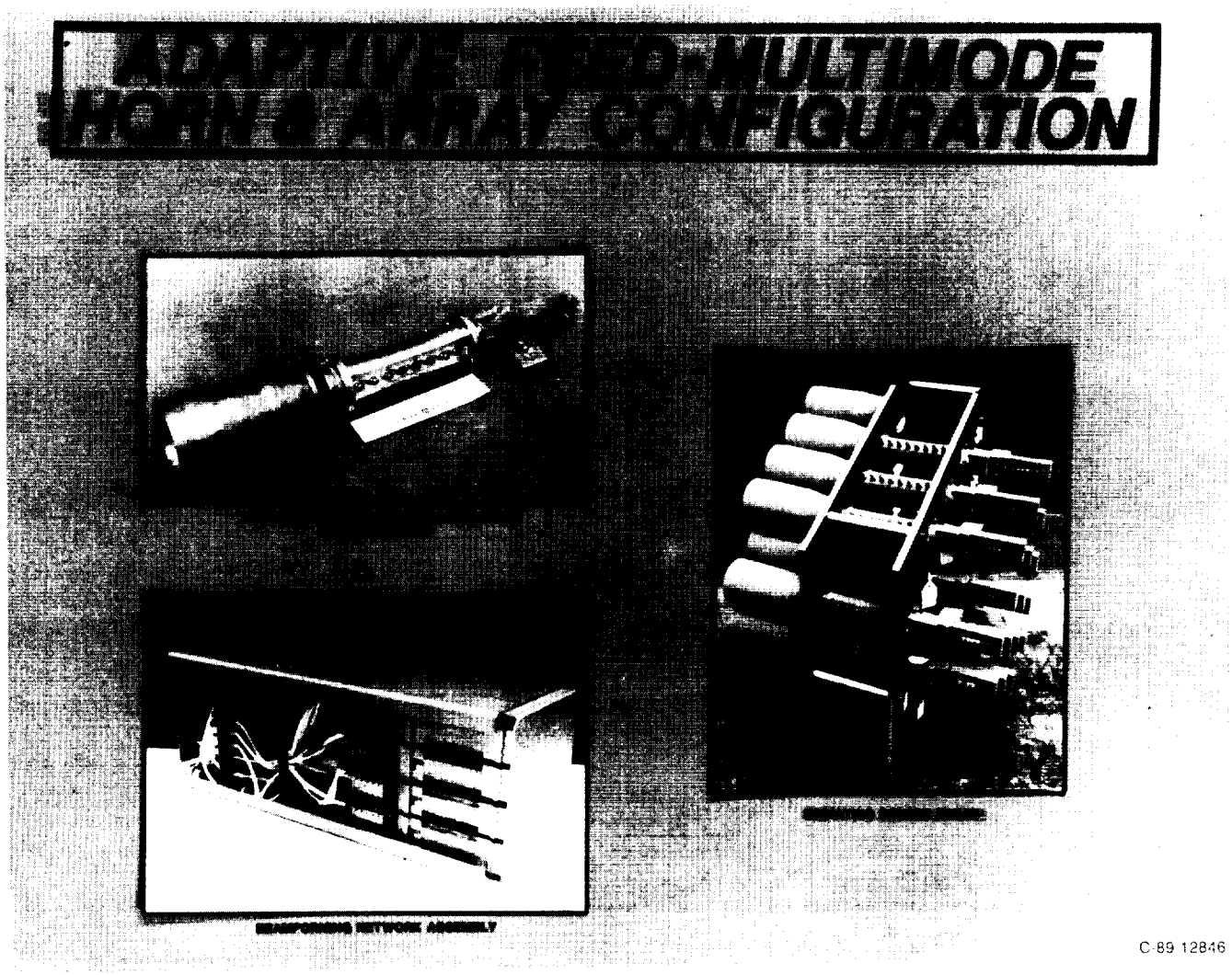
Antenna Surface Target Locations



QUADRANT 4 SURFACE SHAPE
(Tie points only)




Far-Field
Pattern
Near-Field
Phase Front
Adaptive
Feed
Surface
Distortion
Motorized
Control Cords
TURNTABLE
Floor



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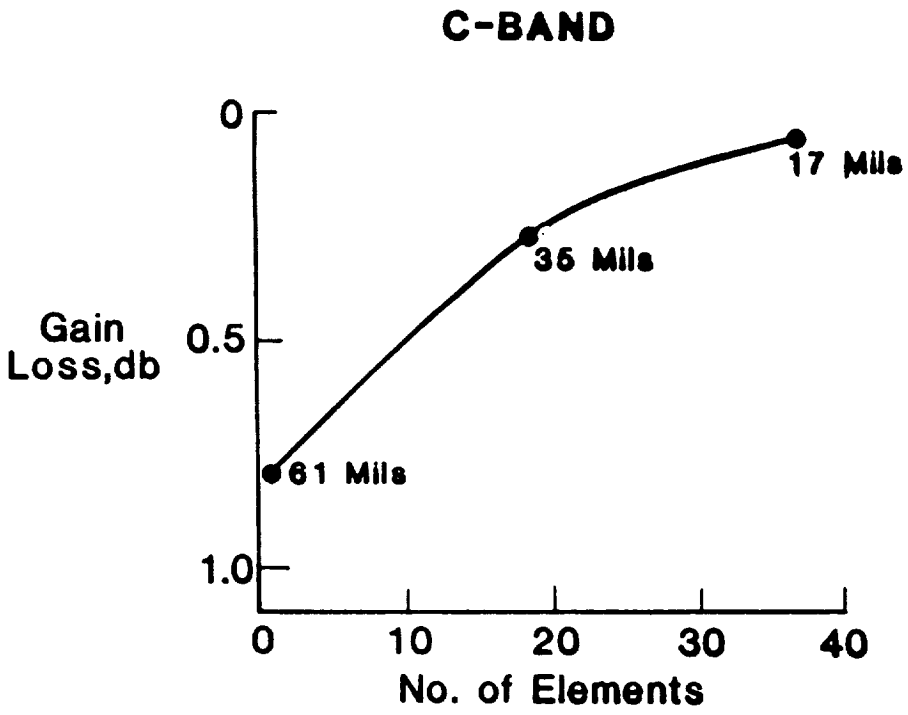
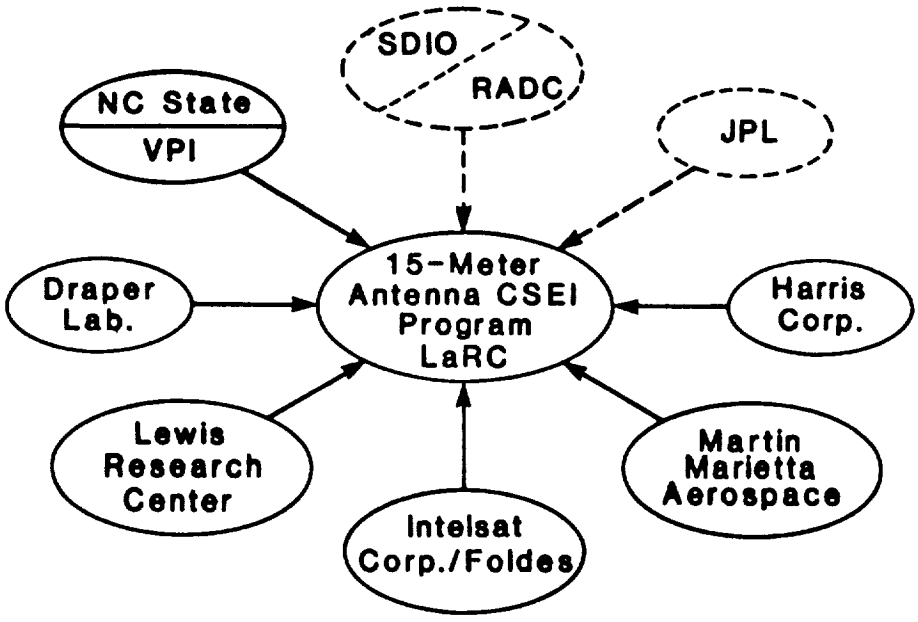
ADAPTIVE FEED COMPENSATION



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