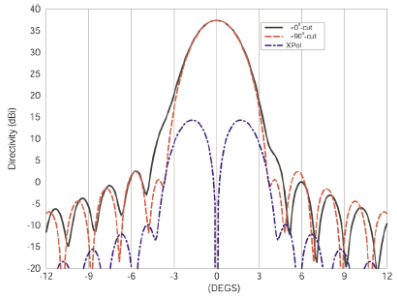
Study of a Spaceborne Microwave Instrument for High Resolution Remote Sensing of the Earth Surface Using a Large-Aperture Mesh

PI: Eni Njoku, JPL

Objective

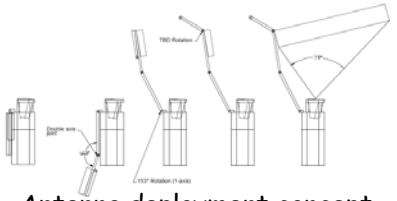
- Develop the Ocean-salinity Soil-moisture Integrated Radiometer-radar Imaging System (OSIRIS) instrument concept for combined passive and active sensing in the 1–3 GHz range, using a 6-m diameter, lightweight, deployable mesh antenna
  - Perform requirements analysis to validate design
  - Perform laboratory measurements of wire mesh samples to determine their microwave emissivity
  - Design the reflector and feed and radar system
  - Perform an antenna and spacecraft configuration study

TRW AstroMesh antenna



Modeled antenna pattern

Outdoor testing of OSIRIS electronics and antenna feed breadboards



Antenna deployment concept

Accomplishments

- Completed requirements analysis and developed the baseline instrument specifications and design, including error budgets
- Completed lab measurements of mesh emissivity and predict the radiometric performance in a simulated orbital thermal environment

Co-Is: W. Wilson, S. Yueh, R. Freeland, R. Helms, M. Thomson (JPL); T. Campbell, W. Lawrence (LaRC); Y. Rahmat-Samii (UCLA)

TRL_{in} = 4 **TRL_{out} = 5**