The Electromagnetic and Mechanical Properties of Structural Composites
Structural Fabrics and Unit Cell Characterization

R. McCauley BME, S. Yarlagadda PhD, Mark Mirotznik PhD
University of Delaware . Center for Composite Materials . Office of Naval Research

ELECTROMAGNETIC PROPERTIES FOR COMPOSITE STRUCTURES
Influence of fabric characteristics on microwave properties of structural composites is not well understood. This project will address these features and give a more complete model for composite design
• Composites for naval structures as well as embedded antennas
• More accurate modeling can be used for custom RF response with hybrid stacking sequences

APPROACH
• Fabric unit cell characterization
• Numerical model development
  • Structural property model from fabric micromechanics
  • Microwave properties from electromagnetic models
• Material characterization for model validation
  • Dry fabric
  • Single layer
  • Multi-layer

UNIT CELL MEASUREMENTS
Geometry needed for unit cell model

MICROWAVE TESTING
Microwave testing chamber
• 18-110 GHz range
• Linear actuator for focusing wavelength location within composite
• Can vary the angle of test specimen

SAMPLE PREPARATION
• Final panel cut to 12X12 inch for testing with warp direction labeled
• Excess cut and orientation labeled for unit cell photographs

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