A REAL-TIME MICROWAVE CAMERA at 24 GHz (K-Band)

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Objective

- Design and build a real-time microwave imaging system (i.e., camera)

Overview

- Microwave imaging offers tremendous potential in many applications:
  - Inspection of low-loss composites, radomes, etc.
  - Detection and evaluation of corrosion under paint
  - Medical imaging
  - Security, contraband detection
- Raster scanning is slow and requires bulky mechanical systems
- A real-time and portable imaging system can be extremely useful for rapid nondestructive testing of large structures

Specification

- Aperture Size: 6" × 6"
- Spatial Resolution: ~0.25"
- Coherent E-Field measurement
- Frequency: 24 GHz
- Dynamic range: 70 dB
- Frame rate: 30 fps
- Real-time focusing

Electric Field Mapping

Actual Amplitude (dB) vs. Measured Amplitude (dB)

Actual Phase (deg) vs. Measured Phase (deg)

Imaging

Sample schematic

Demonstration

See the operation of this imaging system being demonstrated in conjunction with this poster presentation.

Acknowledgment

This work was partially supported by NASA Marshall Space Flight Center (MSFC), Huntsville, AL.