Low Profile Aperture Coupled Microstrip Antenna for Inter CubeSat Communications

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Outline

- Background
- Cube satellite antenna design challenges
- The proposed configuration of antennas for inter CubeSat communications
- The design of an individual proposed Aperture coupling microstrip antenna
- Results
Background

Sun synchronies (Low Earth Orbit) Satellites

Large Satellite
Weight = > 80 Kg
Power = 1000 W

Pico Satellite (Cube Sate)
Weight = 1 Kg
Power = 2 W

Earth Station
Earth
Satellite A
Satellite B
Satellites

Background

Geosynchronous Orbit (GEO)

- True Anomaly Synchronous with Ground
- Useful for Communications
- Altitude = 35,786 km

Sun-Synchronous Orbit
Low Earth Orbit (800-1000 km)

- RAAN Synchronous with Sun
- Useful for remote sensing
- To Simplify Satellite Design
Cube Satellite Antenna Design Challenges

1. Weight and size
2. Power consumption
3. Antenna Gain
4. Deployment mechanism

Large satellite Horn Antenna
Small satellite (Cube satellite) Planar antenna (patch)
The proposed configuration of six planar antennas
The individual ACM antenna design
Simulated results of (a) the total gain, and (b) total directivity of the individual ACM
Using HFSS for simulating the antenna on 2U cubesat
The Quasi Newton method works on the basis of finding the minimum or maximum of a cost function by varying the variables to meet the constraints.

S11 of ACM antenna design
Thank you for your attention.
Time for QUESTIONS