RF COMMUNICATIONS CAPABILITIES

Our designed and manufactured spacecraft microstrip patch antennas are used for many spacecraft programs - including CubeSats, Nanosats and Microsatellites. The patch antennas can support high data rates and at least 10 Watts of transmitted power. Applications include GPS, USAF SGLS, NASA space flight tracking and data network (STDN), and radar transponder. Versions are offered that operate with LHCP, RHCP, or linear polarizations and with single frequency or dual frequency bands. They are supplied in several standard form factors:

- **(A) 4.7” X 4.7”** High gain option, all frequencies
- **(B) 4.0” X 4.0”** Standard antennas
- **(C) 3.3” X 3.3”** SGLS pairs, GPS L1, or GPS L1/L2 pairs
- **(D) 2”X 2”** C or X-band units
- **(E) 1.4” X 1.4”** S-band

The antenna thickness depends on the polarization and number of frequencies (typically 0.120” for single frequency units or 0.180” for dual frequency units). All antennas include robust integral Radomes to protect the radiating elements. The antennas include extensive testing data: Principal Plane Radiation Pattern Plots, Gain Bounds Plots, and Coverage Statistics. Simulations of the expected performance on specific satellites or other vehicles are also available. The antennas may be configured with semi-conductive films for applications where no exposed dielectrics are allowed. BCT offers similar antennas for launch vehicle and rocket vehicle applications which can be supplied in curved conformal formats. LV and rocket vehicle antenna designs have been qualified for major launch vehicle programs. BCT also offers numerous types of custom-designed antenna couplers (Hats) for spacecrafts.
**Gain**
- 4.7" units: +7 dBic on axis
- 4" units: +6 dBic on axis
- Smaller units: +2 dBic on axis
  *(Ground plane, frequency, & size dependent)*

**Frequency**
- L-, S-, C-, or X-bands.
- Single or dual frequency units

**Bandwidth**
- 20 MHz nominal S-band units (frequency dependent)

**HPBW**
- 70 degrees full width (S-band)

**Impedance**
- 50 Ohms

**Polarization**
- Linear or Circular

**VSWR**
- < 1.5:1 at center frequency

**Axial Ratio**
- < 6 dB at center frequency

**Connector**
- SMA Female (others available)

**Mass**
- < 120 grams (4" X 4" units)
- < 20 grams (1.4" X 1.4" units)

**Temperature**
- -100º to +100º C (typical limit)
- -65º to +100º C (operational)

**Power**
- Can handle 10 Watts CW
  *(Connector, cable and substrate dependent)*

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**MICROSTRIP PATCH ANTENNA COUPLERS (HATS)**

4.7" units: +7 dBic on axis
4" units: +6 dBic on axis
Smaller units: +2 dBic on axis
*(Ground plane, frequency, & size dependent)*

L-, S-, C-, or X-bands.
Single or dual frequency units

20 MHz nominal S-band units (frequency dependent)

70 degrees full width (S-band)

50 Ohms

Linear or Circular

SMA Female (others available)

< 120 grams (4" X 4" units)
< 20 grams (1.4" X 1.4" units)

-100º to +100º C (typical limit)
-65º to +100º C (operational)

Can handle 10 Watts CW
*(Connector, cable and substrate dependent)*