NASA SBIR 2014 Phase I Solicitation

S1.02 Microwave Technologies for Remote Sensing

Lead Center: GSFC

Participating Center(s): JPL, LaRC

NASA employs active (radar) and passive (radiometer) microwave sensors for a wide range of remote sensing applications (for example, see: http://www.nap.edu/catalog/11820.html). These sensors include low frequency (less than 10 MHz) sounders to G-band (160 GHz) radars for measuring precipitation and clouds, for planetary landing, upper atmospheric monitoring, and global snow coverage (SCLP). We are seeking proposals for the development of innovative technologies to support these future radar and radiometer missions and applications. The areas of interest for this call are listed below:

- W-band Solid State Power Amplifier: Freq: 94 GHz +/- 500 MHz, Peak power: > 50 W, Duty cycle: > 20 % , Gain: > 40 dB, Gain flatness within band: <+/- 1 dB, Phase linearity within band:< +/- 1 degree, On/off switching speed: < 1 ?s, Noise figure: < 15 dB, Spurious: < -60 dBc, Harmonic: < -25 dBc.
- 640 GHz Polarimeter I, Q, U Channels, Polarimetric measurements to provide microphysical parameterization of ice clouds applicable to ACE.
- Broadband low noise cryogenic amplifier operating between 1 and 6 GHz.
- G-band (140-220 GHz) Components: 3-port strip line/CPW based switch (20 dB isolation, 1 dB loss, 1 kHz switching frequency), G-band (140-220 GHz) Components: Isolator with isolation > 15 dB, Insertion loss < 1.2 dB.
- High power Solid-State Ka-band Transmitter: Psat > 200W, Duty Cycle > 20%, DC to RF Efficiency > 30%, Gain > 50 dB.
- Very high-efficiency VHF Power Amplifier for CubeSats: Center frequency range: 40MHz to 100MHz, Fractional bandwidth: 20%, Psat >25W, Gain > 40 dB, Efficiency > 90%.
- Technology for low-power, rad-tolerant broad band spectrometer back ends for microwave radiometers. Includes: digitizers with 20 Gsps, 20 GHz bandwidth, 4 or more EOB and a simple interface to FPGA; ASIC implementations of polyphase spectrometer digital signal processing with ~1 watt/GHz.
- Back ends for microwave radiometers and sounders including compact low power RFI mitigation hardware for upgrading existing systems and low-power, low-mass filter back ends with >5 GHz spectral coverage, 200 MHz resolution, and less than one watt.