Synopsis:
NASA is seeking sources to develop and deliver a low cost, 1/2U (10cmx5cmx10cm) scientific payload for multipoint space physics measurements on a NanoSat Spacecraft of 1.5U CubeSat form factor.

RFP Title: Low cost 1/2U scientific payloads for multipoint space physics measurements.

1. **Technical Requirements:** NASA seeks to procure a minimum of 14, maximum of 20, identical payload instrument packages to perform distributed multipoint space physics measurements using the ethersat constellation. Each of the payload instrument packages must meet the following technical requirements:
   1.1. Physical
      1.1.1. Total mass less than or equal to _TBD___ grams (from MDC)
      1.1.2. Total volume less than or equal to 5cm x 10cm x 10cm
      1.1.3. External spacecraft surface area required for payload antennas, windows, sensor ports, deployment mechanisms, etc. shall be negotiated before award.
   1.2. Electrical
      1.2.1. Average continuous electrical power required on orbit less than or equal to _TBD__mW at _TBD__VDC (from MDC)
      1.2.2. Maximum peak electrical power required less than ___ mW at ___VDC for ____ seconds per day. (from MDC)
   1.3. Data
      1.3.1. Average data downlink rate required less than or equal to _TBD__ Mbits/day (from MDC)
      1.3.2. Average data uplink rate required less than or equal to _TBD__ Mbits/day (from MDC)
   1.4. Attitude
      1.4.1. The payload shall collect valid science data with spacecraft pointing accuracy no better than 8 degrees and spacecraft attitude knowledge no better than 1 degree.
   1.5. Interface Requirements & Assumptions
      1.5.1. Payload shall interface with a Sparkfun Electronics IOIO board for control and data interfaces with the Android Smartphone-based avionics of the SC.
      1.5.2. Payload developer may assume the availability of the Android bus (CPU, memory, IOIO, usb, cameras, magnetometers, gyros, radios) subject to overall spacecraft overhead.
      1.5.3. The Payload developer may assume the availability of reaction wheels, magnetic torque coils and coarse sun sensor controlled via the android bus.
      1.5.4. The Payload developer may assume master clock and novatel GPS will be carried aboard the SC external to the payload instrument and these clock and GPS data will be available to applications running on the

android bus, as well via the IOIO interface at lower latency though the latency of these data are presently unknown. Proposer should propose a method of obtaining time and position data to the accuracy required by their instrument. Independent low latency access to these data will have to be separately negotiated after proposal selection.

1.5.5. The proposed instrument shall be testable with a "flat sat" SC on the ground.

1.5.6. The proposed instrument shall be designed to meet the launch and space environment, as described in the GSFC –STD-7000 GEVS values for thermal, vibration, and acceleration.

1.5.7. A detailed description of the instrument's capabilities and its software interface will be made available to the public in the course of conducting the EtherSat mission.

1.5.8. The complete detailed design of the instrument as well as software source codes for the instrument will be made available to NASA.

1.5.9. The proposers shall produce a payload instrument final report within __TBD___ months after the launch of the ethersat mission.

1.5.10. Any data successfully collected from the payload on-orbit during the EtherSat mission will be made available by the Spacecraft operations during or shortly after the mission to the payload provider and to the science community at large.

2. Evaluation criteria:

2.1. TBD

3. **SOW: Contract Type: Fixed Price with Priced Options**
   3.1. Cost and Schedule
      3.1.1. The requirement is for the full set of 20 flight units (base + options + spares).
      3.1.2. The flight units must be delivered by November 2012.
      3.1.3. NASA requires at least one engineering development unit delivered June 2012.
   3.2. Produce a design to for a Low cost 0.5U scientific payload/ instrument that will produce measurements required to conduct multipoint space physics Science
      3.2.1. Provide Design Data to the government for review/concurrence
      3.2.2. Provide Material properties and design data to the government required to complete flight safety requirements for a NanoSat launched from a standard CubeSat dispenser LV interface.
      3.2.3. Provide Design Data (Analysis, Design or Test Data) to the government predicting the compatibility/survival with exposure to the Test (Thermal Vacuum, & Vibration), Launch and Space Operations Environments specified in requirement 1.5.6.

   3.3. HW Delivery
      3.3.1. Manufacture and provide to the government the following Engineering Development Unit(s):

         One Unit : Mass/Volume/Electrical , or
         One Mass/volume unit + One Electrical/data interface test unit (not in flight form factor)

      3.3.2. Manufacture 14 flight units with options for up to 20 total flight units
      3.3.3. Spares : 25% of flight units: provide sparing plan/philosophy at Requirements Review: Eg Parts, fully assemble units, or other scenario

   3.4. SW Delivery
         If Payload application SW (Flight or Ground) is required for the payload to operate provide:
         3.4.1.1. The executable payload application SW
         3.4.1.2. Source Code
         3.4.1.3. Documentation
         3.4.1.4. On call SW Debugging support (as required for integration with Flight or ground operations SW for the mission)
      3.4.2.
   3.5. Test, Test Data / Reports
      3.5.1. Reports that demonstrate the functional test of the flight units before delivery to the government
      3.5.2. Payload Mass Properties

- 3.5.3. Payload Power Draw

- 3.6. Material Properties Report(in support of flight safety)
- 3.7. Interface Agreement / Specification
- 3.8. Post delivery Technical Support?
- 3.9. Reviews
  - 3.9.1. Requirements Review/Contract negotiation
  - 3.9.2. Design Review
  - 3.9.3. Pre ship Review