NASA SBIR 2016 Phase I Solicitation

S3.04 Unmanned Aircraft and Sounding Rocket Technologies

Lead Center: GSFC

Participating Center(s): AFRC, ARC, GRC, JPL, LaRC

Unmanned Aircraft Systems Technologies

Breakthrough technologies are sought that will enhance performance and utility of NASA's Airborne Science fleet with unmanned aircraft systems (UAS). Novel instrumented platforms or innovative subsystems suitable for addressing specific Earth science research goals are desired. Relevant NASA and FAA requirements must be addressed. Potential concepts include:

- Long endurance (~1 month) small UAS for miniature (~2 lb) instrument packages scalable to larger platforms.
- Fuel cell propulsion and high efficiency airframes for high altitude/long endurance (HALE, target ~50 kft, 2 days endurance with 50 lb payload).
- Harsh environment flight (e.g., for volcanic eruptions, fires) including high density altitude (20 kft asl), high turbulence, high temperature (300 to 500° C), significant icing, or corrosive environments.
- Novel flight management approaches such as dynamic soaring, autonomous mission planning, terrain following, or autonomously linking aircraft.
- Small UAS for in-situ cloud measurements.
- Guided dropsondes.
- Airspace monitoring system for small UAS operations.
- Over-the-horizon communications systems with increased bandwidth.

Sounding Rocket Technologies

The NASA Sounding Rockets Program provides low-cost, sub-orbital access to space in support of space and Earth sciences research. NASA utilizes a variety of vehicle systems comprised of surplus and commercially available rocket motors, capable of lofting scientific payloads of up to 1300lbs, to altitudes from 100km to 1500km. NASA launches sounding rocket vehicles worldwide, from both land-based and water-based ranges, based on the science needs to study phenomenon in specific locations. Of particular interest are systems that will enable water recovery of payloads from high altitude flights from locations such as launch ranges at Wallops Island VA or Andoya, Norway. New telemetry approaches are also encouraged. Specific elements may include:

- High speed decelerators.
- Steerable high altitude parachute systems.
- Water recovery aids such as floatation devices, location systems, and robotic capabilities.

- Ruggedized over-the-horizon telemetry systems with increased bandwidth.
- Constellation communication for sub-to-main payload data telemetry
- 10 to 50 MB/s for primary data, 1 to 2 MB/s for sub payloads, ~30 cubic inches (without antenna), with C or S band desired