NASA SBIR 2017 Phase I Solicitation

H9.05 Transformational/Over-the-Horizon Communications Technology

Lead Center: GRC

Participating Center(s): GSFC, JPL

Technology Area: TA5 Communication and Navigation

NASA seeks revolutionary, transformational communications technologies that emphasize not only dramatic reduction in system size, mass, and power but also dramatic implementation and operational cost savings while improving overall communications architecture performance. The proposer is expected to identify new ideas, create novel solutions and execute feasibility demonstrations. Emphasis for this subtopic is on the far-term (?10yrs.) insofar as mission insertion and commercialization but it is expected that the proposer proves fundamental feasibility via prototyping within the normal scope of the SBIR program. The over-the-horizon communications technology development will focus research in the following areas:

- Systems optimized for energy efficiency (information bits per unit energy).
- Advanced materials; smart materials; electronics embedded in structures; functional materials.
- Technologies that address flexible, scalable digital/optical core processing topologies to support both RF and optical communications in a single terminal.
- Nanoelectronics and nanomagnetcis; quantum logic gates; single electron computing; superconducting devices; technologies to leapfrog Moore’s law.
- Quantum communications, methods for probing quantum phenomenon, methods for exploiting exotic aspects of quantum theory.
- Human/machine and brain-machine interfacing; the convergence of electronic engineering and bio-engineering; neural signal interfacing.

The research should be conducted to demonstrate theoretical and technical feasibility during the Phase I and Phase II development cycles and be able to demonstrate an evolutionary path to insertion within approximately 10 years. Delivery of a prototype of the most critically enabling element of the technology for NASA testing at the completion of the Phase II contract is expected.

Phase I deliverables shall include a final report describing theoretical analysis and prototyping concepts. The technology should have eventual commercialization potential. For Phase II consideration, the final report should include a detailed path towards Phase II prototype hardware.