



NASA SBIR 2015 Phase I Solicitation

A1.01 Structural Efficiency-Hybrid Nanocomposites

Lead Center: LaRC

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Two of the primary goals of the Advanced Air Vehicles program are safety and efficiency, which can be achieved simultaneously through designer materials tailored for future aircraft structures. The SOA for lightweight structures are carbon fiber reinforced polymeric composites which make up approximately 50% of the weight of Boeing's 787. Adoption of all-carbon nanotube (CNT) composites to exploit their potential for enhancing structural efficiency is viewed as too far term, given the current state of CNT technology maturation. A more attainable approach is to take advantage of the multifunctionality offered by CNTs through the use of hybrid composites where CNTs are integrated into conventional carbon fiber reinforced composite structures. Hybrid composites enable improved mechanical properties such as interlaminar strength, while simultaneously increasing electrical and thermal conductivity to enable features such as lightning strike protection, embedded sensing, etc. The targeted outcome is reduced weight and enhanced safety performance for future hybrid composite aircraft structures. For this subtopic, the plan is to start phase 1 with a systems analysis approach to identify the benefits and target areas for hybrid composite utility and to provide some direction and benefit analysis for applying hybrid composites in aircraft structures. Then the intention of the Phase II would be to tailor, build and test the materials to demonstrate the property enhancements identified in Phase I.