NASA SBIR 2014 Phase I Solicitation

A3.06 Rotorcraft

Lead Center: ARC

Participating Center(s): GRC, LaRC

The challenge of the Rotary Wing thrust of the NASA Fundamental Aeronautics Program is to develop and validate tools, technologies and concepts to overcome key barriers for rotary wing vehicles. Technologies of particular interest are as follows:

- The use of small vertical lift UAVs has increased in recent times with many civilian applications missions being proposed, including autonomous surveillance, mapping, etc. Much of the current research associated with these vehicles has been in the areas of electric propulsion, batteries, small sensors and autonomous control laws, while very little attention has been paid to their acoustic characteristics. The generation and propagation of noise associated with this small class of vertical lift UAVs are not well understood and prediction tools have not been developed or validated for this class of vehicles. The objective of a proposed effort is to develop design and analysis tools for the prediction of acoustics for small vertical lift UAVs, such as quad-copters, coaxial rotor UAVs, ducted fan rotors, etc. Proposals are also sought that include measurement and characterization of noise associated with this class of small vertical lift UAVs.
- A transition to low-carbon propulsion has the promise of dramatically reducing the emissions from full-scale rotorcraft, as well as reducing overall fuel consumption and operating cost. All-electric and hybrid electric propulsion systems could be beneficial to rotorcraft due to high power requirements of hover and integrated motor-drive systems designs that could be realized. The objective of a proposed effort is to investigate, develop and/or demonstrate all-electric and hybrid electric architectures specific to full-scale rotorcraft drive and propulsion system applications. Validated modeling and analysis tools for all-electric and hybrid electric propulsions systems are also sought in this solicitation, as are system studies of various hybrid/electric architectures to show their relative benefits in-terms of weight, efficiency, emissions and fuel consumption for full-scale rotorcraft applications.

Proposals on other rotorcraft technologies will also be considered but the primary emphasis of the solicitation will be on the above two identified technical areas.