NASA SBIR 2010 Phase I Solicitation

A5.02 Open Rotor Installed Thrust

Lead Center: AFRC

NASA’s Environmentally Responsible Aviation (ERA) project seeks simultaneous, aggressive reductions in noise, emissions and fuel burn for transport category aircraft in the N+2 timeframe. A significant reduction in Specific Fuel Consumption (SFC) will be required to meet the goal of a 50% reduction in fuel burn.

One path that engine manufacturers are proposing to meet the required SFC improvements is a return to the open rotor technology first tested in the 1980’s. Many challenges to using open rotors on future generations of aircraft exist, both from the design and operations standpoint. One of the design challenges of the open rotor is determining the in-flight installed thrust of the open rotor on the aircraft.

Current practice with turbofans involves an extensive series of ground tests that determine corrections for the installed engine thrust relative to its measured uninstalled configuration. Currently, there is no acceptable method that has been proven to duplicate this for open rotors. Additionally, there is currently no way to directly measure thrust during flight on an installed engine for this class of aircraft.

This solicitation seeks proposals to develop and validate:

Develop methods and techniques to correct ground tested thrust measurements for installed, in-flight effects of an open rotor propulsion system.

Develop methods and conceptual designs for hardware that would allow for the direct measurement of thrust in flight, throughout the full flight envelope. This measurement system must be robust enough to withstand the full flight and maneuvering envelop used during flight testing of a new aircraft while being precise enough to measure the thrust at all power settings.