A5.03 Variable Cycle Propulsion

Proposals for the variable cycle propulsion subtopic will address engine and engine integration topics as outlined in this section in support of the Integrated System Research Program.

Variable cycle propulsion concepts can potentially help the Environmentally Responsible Aviation (ERA) Project reach its aggressive fuel burn, noise, and emissions goals for the N+2 timeframe by taking advantage of engine and engine/airframe integration concepts that allow the system to optimize over the entire flight envelope. For example, a variable cycle concept may allow the aircraft system to fly efficiently at multiple flight speeds or altitudes, shift noise and emissions production to less critical phases of the mission, or allow for more efficient operation within airspace constraints.

Proposals are solicited that address this opportunity by developing system analysis tools and applying them to variable cycle engine concepts that can address the mission fuel burn, noise, and emissions goals for the ERA Project. Proposed efforts should identify one or more specific variable cycle concepts and assess their impact upon all three ERA metrics (fuel burn, noise, and emissions) for at least one representative long range, subsonic transport, passenger or cargo mission profile (60,000 to 100,000 lbs equivalent payload carried for 6000 nmi, at approximately 0.78-0.85 Mach number). System analysis tools should be developed and employed to adequately capture the combined effects of engine architecture concepts and their integration into airframe designs envisioned for the N+2 timeframe. Specific enabling technologies for these variable cycle system concepts should be identified and prioritized for future development. Such enabling technologies may include, but are not limited to concepts related to engine inlet, fan, compressor, combustor, turbine, nozzle components and their integration.