A2.05  Revolutionary Materials and Structures Technology for Propulsion and Power Components

This subtopic addresses structural and mechanical components, subsystems and advanced materials for Aerospace Propulsion and Power Systems. Proposals are sought for innovative and commercially viable concepts that address objectives such as lighter weight, reduced operational costs, lower noise, lower emissions, higher temperature capability, increased efficiency and/or operational margin, greater safety and reliability, and more time on-station for aircraft, satellites, and power equipment.

One focus is on problems related to structural and mechanical components and subsystems that operate at high temperatures, in hostile aero-thermo-chemical environments or space environments, and at high stresses under cyclic loading conditions. Interests include magnetic, foil, and fluid film bearings, tribological coatings, seals, transmissions, noise reduction, flight weight electric motors, rotating equipment, aeroelasticity, ballistic impacts, fatigue, fracture, life prediction, probabilistic methods, and structural health monitoring (diagnostics and prognosis).

A second focus addresses advanced materials, their development, and their application to primary propulsion systems such as aircraft gas turbines, rocket and turbine-based combined cycle engines, and rocket engines as well as auxiliary power sources in aircraft and space vehicles. Materials of interest include any classes especially those used in propulsion systems such as high-temperature polymers and composites, metals including titanium alloys and nickel-based super alloys, ceramics and ceramic matrix composites, and coatings for these, and processes for their economical and reliable preparation.