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:

- **Modeling and Analysis for Conceptual Design and Sizing** - Tools are sought that enable rotorcraft conceptual design and sizing for a wide range of missions. Such tools should also enable systems studies to assess technology benefits. These tools typically model the various rotorcraft components using lower fidelity, approximate and/or empirically based models, and improvements in these tools can be made through developing more accurate rotorcraft component models that are appropriate for conceptual design. The development of methodologies, tools and techniques that include rotorcraft handling qualities during conceptual design is of particular interest with topics including: flight control architecture and handling qualities measures; rotorcraft configuration and data requirements; and methods for integration into conceptual design and sizing codes and analyses. Additional topics of interest include, but are not limited to: engine and drive system models over large rotor speed ranges; auto generation of airfoil tables and analysis and optimization of airfoil sections; noise estimation methods for rotor, engine and drive systems; and airspace performance analysis tools for rotocraft.

- **Advanced Turboshaft Engines with Variable-Speed Power-Turbine Capability** - Research (modeling, computational work, experiments) that addresses variable-speed power turbine (VSPT) and gas-generator aerothermodynamic, mechanical, and materials challenges is sought. The Rotary Wing Project of the Fundamental Aeronautics Program performs research and development of engine/driveline technologies to enable large civil tilt-rotor vehicles with variable-speed-rotor capability. Options for achieving main-rotor speed variability include a variable-speed transmission and/or a variable-speed power turbine. Key challenges for turboshaft engines of future rotary wing vehicles include high-efficiency power-turbine performance over a wide variable-speed range (50%);

Proposals on other rotorcraft technologies will also be considered as resources and priorities allow, but the primary emphasis of the solicitation will be on the above two identified technical areas.