The need for rapid response in military and civilian rescue and other emergency operations is paramount. Future emergency mission requirements, including rescue and special operations, have shown a critical need for higher cruise speeds that are possible with conventional rotorcraft. Helicopters have been the traditional vehicles for these missions because of their VTOL capabilities and ability to hover, but their response times have always been too long. As the U.S. Military is increasingly finding itself pushed into more and more expeditionary operations around the world, there is a great need for an aircraft that will supply both vertical take-off and landing with efficient long-range cruise – a feature the helicopter does not have. The proposed concept in this study contains the unique combination of efficient vertical take-off and landing capabilities of a helicopter with that of the high-speed cruise efficiencies of a fixed wing aircraft. The MODUS Verticraft design described in this study is capable of meeting these requirements.

In this study, the primary task will include the aerodynamic analysis of the disk plan-form including analysis of the disk and fuselage drag profiles for flight regimes from 150 to 500 knots at altitudes from 1000 to 15,000 feet MSL. This task will also involve an assessment of previous NASA study results on low aspect ratio airfoils. Selection of an optimum plan-form for use in the analysis of VTOL and cruise lift and vehicle stability and control dynamics for transition to hover from horizontal flight will be made in order to conduct a preliminary analysis of these characteristics.

Labor and computer facility uses, plus associated engineering assessments of prior airfoil designs, and scientific analysis of vehicle aerodynamics, aeromechanics, structural integrity and stability are the main cost elements of the study.