

Enclosure A

UNITED TECHNOLOGIES RESEARCH CENTER STATEMENT OF WORK

A. Introduction / Background

UTRC will be submitting a proposal to the Army in response to solicitation number: Adaptive Biomimetic Aircraft Structures (ABAS), W911W6-17-R-0018. UTRC is requesting RPI to support this effort in the following areas:

1. Benefit analysis of an adaptive/morphing rotor blade
2. Structural analysis of a typical blade section incorporating lattice structures
3. Small scale risk reduction proof-of-concept of lattice structures

The project will be completed in 30 months with an anticipated start in the first quarter of 2018.

B. Tasks

1. Benefit Analysis of an adaptive/morphing rotor blade

RPI will use an agreed-upon baseline rotor blade, for detailed aerodynamic analysis. The degree and type of shape morphing will be related to the benefit proposition as it relates to the tradeoff between hover and forward flight. Most pertinent profiles will be used for this analysis. RPI will define the exact geometry change, i.e. profile change required to meet performance benefits. Concepts for transition from fixed non-morphing sections to morphing portion of the rotor blade will be defined and analyzed.

2. Structural analysis of underlying lattice structure

RPI will develop a lattice structure concept and design conducive to the prescribed shape changes and then perform a detailed structural analysis to confirm that the concept is operable under the requisite aero and structural loads at various sections of the rotor blade. Local stress concentrations will be documented to show that the design falls within acceptable limits for the chosen material.

3. Proof-of-concept lattice structure demonstration

RPI will fabricate a representative sub-scale lattice structure made from aerospace representative materials (such as 7075 Aluminum). Experimentally measured deformation under applied load will be validated with simulation results from Task 2. The ability to achieve requisite shape change will be experimentally. It is anticipated that more than one proof-of-concept demonstration articles will be built and tested.

4. Support customer interactions communications and scheduled meetings

RPI will support meetings and telecoms to review progress and exchange information. Further RPI, when required will attend annual reviews in person. RPI will also provide quarterly progress reports

C. Deliverables

1. Report and presentations documents morphing benefit analysis
2. Detailed structural analysis showing feasibility of lattice structure
3. Functional proof-of-concept demonstration article/s
4. Scheduled reports/presentations, meeting attendance when required and final report
5. Support final briefing at Ft. Eustis, VA upon completion of all technical effort

D. Preliminary Schedule

The anticipated start of the project is 1st quarter of 2018

Task 1 – completed in first 9 months

Task 2 – completed by 12 months from start

Task 3 – completed by 18 months from start

Task 4 – Reports, presentations, meeting interspersed through the 3 year program

Approximate funding based on the guidance provided in the BAA is as follows. This is likely to be revised after the award

2018 - \$40k, 2019 \$60k, 2020 \$35k

United Technologies Research Center.

This page contains no technical data subject to the EAR or the ITAR.

E. Travel

Two trips to UTRC to support annual reviews
Final briefing at Ft Eustis

F. Security

All the work performed under this contract will adhere to EAR99