FOA-AFRL-AFOSR-2023-0006: Summary of Pre-proposal Inquiries
CENTER OF EXCELLENCE (COE): Intelligent Structures for Morphing High Speed Vehicles
AFOSR PO: Dr. Gregg Abate, gregg.abate@us.af.mil

Q1: The call says "high speed vehicles". Could you elaborate on 1) Mach number range of interest (subsonic/supersonic/hypersonic/all); and 2) elaborate on any platforms that will be of particular interest (strike weapons, interceptors, glide vehicles, powered missiles, etc) or is it a broad scope in application?

A1: Referring to the footnote on page 7 of the FOA: "High-speed morphing refers to smooth outer mold line shape change in supersonic or greater flight regimes." There is no particular platform of interest and the scope of relevant applications is broad.

Q2: Are improvements to the low-speed performance of high-speed vehicles of interest under this solicitation?

A2: The main interest is aircraft morphing in supersonic regimes and above.

Q3: Is hypersonic morphing of more interest than supersonic morphing?

A3: No.

Q4: Would work addressing the challenges and opportunities for vehicles operating in the Mach 6-8 regime be responsive to the FOA?

A4: Supersonic regimes or higher are of interest and considered responsive to the FOA.

Q5: What is the primary flow regime of interest, supersonic or hypersonic? If hypersonic, does this extend to high-enthalpy flows?

A5: The flow regime of interest is supersonic or higher. High-enthalpy flows are not excluded.

Q6: Is there any interest in morphing to provide improved thermal management (rather than aerodynamic/stability benefits)?

A6: Yes, as improved thermal management could enable new flight regimes and vehicle performance gains.

Q7: Should we be looking to integrate and apply the intelligent structure to a vehicle design as a demonstration of the concepts?

A7: No.

Q8: Are there specific C-SWaP requirements that must be met with the proposed approaches?

A8: There are no specific C-SWaP requirements with the proposed approaches.

Q9: How rigorous is the definition of morphing in this solicitation? Could the use of active flow control integrated into the design of the aircraft be considered a morphing technology?

A9: Here, morphing refers to the active and smooth deformation of vehicle geometry. Fluids may accomplish morphing action where active flow control is involved. However, not all active flow control is morphing. For example, a synthetic jet actuator is a flow momentum actuation device and not a morphing surface or geometry.

Q10: Are flying stores with oblique wings that open upon release considered morphing?

A10: Morphing is the active and smooth deformation of vehicle geometry. If the wing deployment follows this definition, then technically it is a morphing action. Note that not all morphing actions follow the sense-assess-respond loop.

Q11: Is a data-driven approach with off-line and on-line computations for morphing decision making of interest?

A11: Any approach that fits within the described sense-assess-respond framework described in the FOA is of potential interest.

Q12: Is autonomy viewed to be critical for the Sense-Assess-Respond (SAR) framework?

A12: Approaches that address the SAR framework as described in the FOA are of primary interest.

Q13: What are some AFRL applications of interest that motivate this high-speed morphing work?

A13: There are no specific AFRL applications for this CoE. As outlined in Section A.3.:

"The overarching goal of this CoE is to develop basic research foundations within a Sense-Assess-Respond (SAR) control framework to fully exploit performance opportunities from morphing aircraft at high speed."

Q14: Should we highlight specific AFRL collaborators in the proposal?

A14: Highlighting AFRL researchers in the collaboration plan is encouraged, but not required.

Q15: Are there any suggested contacts at AFRL/RW, RQ, and RX whom we may interact with to better identify intelligent structure geometries of interest?

A15: Please see Section G.1. of the FOA.

Q16: Would AFRL be amenable to using their von Kármán Gas Dynamics Facility (VKF) Wind Tunnel D at Arnold Air Force Base for proposed supersonic experiments? Would collaborative support to operate the tunnel also be available?

A16: AFRL is open to leveraging the VKF Tunnel D in support of this CoE. However, the availability of the tunnel and support to operate it cannot be guaranteed at this time.

Q17: What is the breakdown of reviewers?

A17: All reviewers will be AFRL personnel.

Q18: Does the call allow a team member to be a consultant from a small business?

A18: Section C.1. addresses eligibility of offerors. It states:

"You are eligible to submit an application if you are a qualified and responsible educational institution in the United States as defined at 10 U.S.C. 2194, or an entity comprised of such educational institutions. Educational institution means a local educational agency, college, university, or any other nonprofit institution dedicated to improving science, mathematics, and engineering education. No other entities are eligible to submit applications under this competition. Any entities receiving subawards must meet these same criteria."

Q19: Is it possible to include an "international collaborator/consultant" as part of the CoE?

A19: As outlined in Section C.1. of the FOA, such entities are ineligible for this opportunity.

Q20: In responding to the CoE call, it says we may include up to one more University. Does it have to be a US university or can it be a foreign institution?

A20: Only US universities are eligible for this opportunity (see Section C.1.A. of the FOA).

Q21: How stringent is the two-university policy?

A21: As outlined in the FOA, an awarded will be limited to "no more than two universities."

Q22: If awarded, can we add additional PI's?

A22: Yes, but the funding level and technical scope must remain unchanged.

Q23: How many PIs are typically expected for a Center of Excellence?

A23: There is no specific requirement on the number of PIs. The number of PIs will depend how each team plans to cover the disciplines of interest called out in Section 4 of the FOA, specifically:

"This CoE brings together the fields of morphing aerospace science, adaptive and sensing materials, information theory, and feedback control. This CoE is expected to lead to the cross-pollination of the adaptive structures community with the information theory and data fusion communities."

Q24: Is including information theory expertise viewed as critical to the success of the proposal?

A24: Information theory is one of the primary disciplines of interest for this call. See Section 4 of the FOA.

Q25: Is there a specific expectation on the balance of theoretical, computational and experimental work included in the proposal?

A25: No.

Q26: What is the breakdown between fundamental and applied research?

A26: There is no prescribed breakdown.

Q27: Is there room for fundamental development of new actuation methods?

A27: This is addressed in Section A.3.3. of the FOA.

Q28: What is the emphasis between research and workforce development? Is there a breakdown between the two?

A28: There is no set or desired breakdown between the two. Please refer to the evaluation criteria of the FOA (Section E.1.)

Q29: What is the expectation for the COE beyond the 5 years laid out in the FOA?

A29: The funding for the CoE is limited to 5 years. There is no expectation beyond that.