Broad Agency Announcement 08-017
"Development of Marine Composite Propeller Technology"

Amendment Number 0002

The purpose of Amendment Number 0002 is to revise:

1. Section I, entitled “General Information”, paragraph 5, entitled “Response Date”, is hereby revised as follows:

   “5. Response Date

   Full proposals are due by no later than 2:00 pm (Eastern Daylight Time) on **27 AUG 2008**”

2. Section I, entitled “General Information”, paragraph 6, entitled “Research Opportunity Description”, sub-paragraph 6.2, entitled “Program Plan”, is hereby revised as follows:

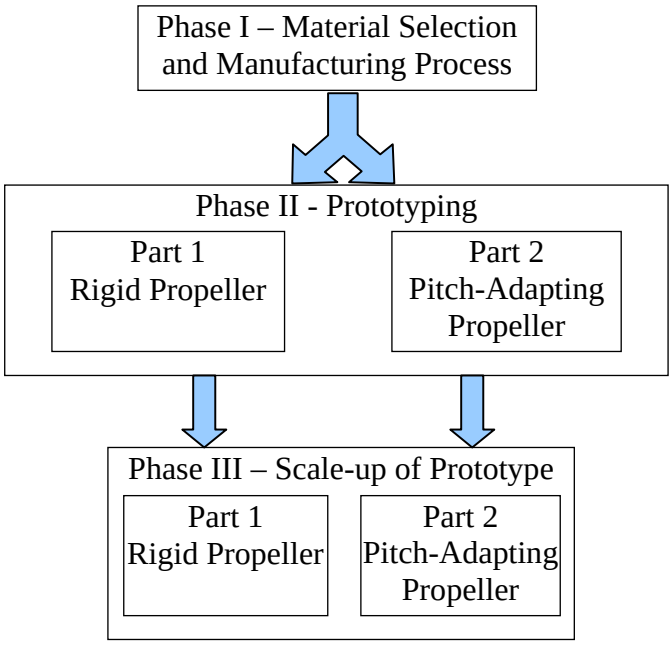
   “6.2 Program Plan

   The objective of this program is to develop, demonstrate and transition composite propeller technology for applications to naval ships and submerged vehicles. Two types of composite propellers will be developed under this program: rigid and pitch-adapting.

   The program will consist of three phases. The first phase will have up to three vendors. The purpose of the first phase is to evaluate the vendor's structural design and manufacturing capabilities. The second phase will have up to two vendors and use a building block approach to develop the structural design and manufacturing capabilities for the unique geometries involved in propeller manufacture. The third phase will have up to two vendors and focus on structural design and manufacture of propellers at large scale. **The Government will be responsible for the hydrodynamic design of the propellers. The Government will provide blade geometries, hub geometries (when needed) and loading profiles at the beginning of each phase. The vendor’s responsibilities include but are not limited to material selection, manufacturing process, material lay-up and structural design. In the second and third phases the vendors and Government will work to interface the structural and hydrodynamic designs.**

   All phases will have Classified and Unclassified structural design components. The manufacturing process in the first phase will be Unclassified. The manufacturing process in the subsequent phases will be Classified.

   The following is a block diagram illustrating the different phases:



Phase I – Phase I is designed to evaluate the vendor's material selection and rationale, and manufacturing and structural design capabilities.

Vendors shall be required to manufacture material coupons and a ~30"-span* rigid propeller blade with complex curvatures based on the geometries, load profiles and other criteria such as maximum stress and deflection provided by the Government. **The propeller blade and material coupons will be tested by the Government to see if they meet the criteria laid out in the Classified Enclosure. These specimens will be tested in air at temperatures between 65F and 85F degrees.**

Each vendor will develop plans to address the following issues:

- Scaling of the propeller structural design to a 14'-diameter and a 24'-diameter,
- Manufacturing/laying-up of a propeller geometry including both rigid and pitch-adapting capabilities,
- Manufacturing of leading and trailing edge geometries,
- Design of a robust blade-to-hub connection for replaceable blades for the loads provided by the Government that has the capability of replacing blades, and
- Cost estimates for subsequent phase as well as for full-scale (24'-diameter) propeller manufacture.

The structural design capabilities as well as the manufacturing quality are considered integral to the success of the program. The vendors should consider, but not limit themselves to, the following critical performance in their design plans: fatigue life, cavitation erosion, shock response, extreme reverse conditions (crashback), fouling, impact resistance, corrosion, and blade replacement.

The products of this program include both single blades and full propellers with hubs. As a measure of the size, the term "span" is used for a single blade, and "diameter" for a full propeller with hub.

Phase II – The tentative plan for Phase II is to develop structural design and prototype multiple composite propellers culminating in large-scale manufacture of prototype propellers. There are potentially two different parts in Phase II: the structural design and manufacture of *rigid* and *pitch-adapting* propellers.

Part 1 of Phase II will involve the structural design and manufacture of a ~3'-diameter rigid propeller based on the geometries and load profiles provided by the Government. Additionally, a ~6'-span rigid blade will be manufactured as a demonstration of large-scale manufacturing capabilities. The Government will perform structural evaluation on the ~6'-span rigid blade. Additional prototypes of complex geometries, such as the blade-to-hub connection and the leading and trailing edges, will be manufactured for risk mitigation purposes.

Part 2 of Phase II will involve the structural design and manufacture of up to two ~3'-diameter pitch-adapting propellers based on the geometries, load profiles, and deflection criteria provided by the Government. Additional prototypes of complex geometries, such as the blade-to-hub connection and the leading and trailing edges, will be manufactured for risk mitigation purposes.

All the ~3'-diameter propellers (rigid and pitch-adapting) will be tested by the Government in the Large Cavitation Channel (LCC) in Memphis, Tennessee for hydrodynamic performance. The ~3'-diameter propellers and other hardware will also be tested both non-destructively and destructively for manufacturing quality.

Phase III – The tentative plan for Phase III is as follows. Phase III will also potentially have two parts. In Part 1, a 14'-diameter rigid propeller will be structurally designed and manufactured for at-sea trials.

In Part 2, a ~6'-diameter pitch-adapting propeller will be structurally designed and manufactured for in-water testing on a large-scale demonstration platform. Additionally, a ~10'-span pitch-adapting blade will be structurally designed and manufactured for structural performance evaluation.

The geometries, load profiles, and deflection criteria for the blade and propellers will be provided by the Government."

3. Section V, entitled "Evaluation Information", paragraph 1, entitled "Evaluation Criteria" is hereby revised to read as follows:

"1. Evaluation Criteria

Award decisions will be based on a competitive selection of proposals resulting from a scientific and cost review. Evaluations will be conducted using the following evaluation criteria:

(1) The offeror's capabilities, related experience, facilities, techniques or unique combination of these which are integral factors for achieving the proposal objectives;
(2) Overall scientific and technical merits of the proposal;
(3) The qualifications, capabilities and experience of the proposed Principal Investigator (PI) team leader, and key personnel who are critical in achieving the proposal objectives; and
(4) The realism of the proposed costs and availability of funds

Overall the technical factors (1-3) are more important than the cost factors. The technical factors are listed in descending order of importance. The degree of importance of cost will increase with the degree of equality of the proposals in relation to the other factors on which selection is to be based, or when the cost is so significantly high as to diminish the value of the proposal's technical superiority to the Government.

For proposed awards to be made as contracts to large businesses, the socio-economic merits of each proposal will be evaluated based on the extent of the offeror's commitment in providing meaningful subcontracting opportunities for small businesses, small disadvantages businesses, women-owned small businesses, HUBZone small businesses, veteran-owned small businesses, service-disabled veteran-owned small businesses, historically black colleges and universities and minority institutions.

The Government will only evaluate the cost proposal for Phase I, Delivery Order 0001. After the completion of Phase I, the Government will require a new proposal for Phase II and III, and those will be evaluated upon receipt."