

## **BAA09-06 Questions and Answers**

**Question 1: Will there be a teaming and information site available?**

Answer 1: A teaming site is now available and can be accessed at: <http://www.davincinetbook.com/teams>. The proposer day briefing and attendee list is available at: <http://www.darpa.mil/baa>.

**Question 2: Why develop a subplane?**

Answer 2: Detailed in BAA Section 1.1.

**Question 3: What support do you have from SOCOM or a Service?**

Answer 3: This stage of the effort is completely funded by DARPA.

**Question 4: Is there an expectation for 3-day loiter? Air? Surface? Subsurface?**

Answer 4: Platform can loiter in any mode of operation.

**Question 5: Does the vehicle have to survive more than one mission?**

Answer 5: Yes.

**Question 6: Does a winning proposal have to have a complete conceptual design or can we propose technologies that ultimately support that design?**

Answer 6: Key program elements are described in detail in BAA Section 1.2.2.

**Question 7: Will the proposal favor low TRL technologies if the payoff is high?**

Answer 7: The proposals evaluation criteria are clearly laid out in the BAA Section 5.

**Question 8: Will DARPA fund only portions of the proposal?**

Answer 8: See BAA Section 2, "...Additionally, DARPA reserves the right to accept proposals in their entirety or to select only portions of a proposals for award."

**Question 9: Is the payload 2,000 lbs or 8 operators at 250 lbs/each? Or, are you looking for 8 operators at 250 lbs each + 2,000 lbs cargo?**

Answer 9: The platform should be capable of transporting 8 operators, as well as all of their equipment, with a total cargo weight of 2000 pounds, reference BAA Section 1.2.1.

**Question 10: Does the 2,000lbs of cargo include personnel or are personnel in addition?**

Answer 10: See answer to question 9.

**Question 11: Does cargo have to be brought back to base?**

Answer 11: Yes.

**Question 12: Do support assets only supply fuel, or can they provide additional resources (such as replace aerodynamic structure components)?**

Answer 12: Support assets can supply fuel, lubrication oil, food, and other conventional consumable items not replacement structures.

**Question 13: What is the desired submersible depth?**

Answer 13: The submersible depth will be dictated by the design concept and the associated CONOPS.

**Question 14: Is there a test depth rating for submerged operations?**

Answer 14: No, the structural and system requirements of the platform will depend on your technical approach

**Question 15: What is the minimum sea state for landing and take off?**

Answer 15: The minimum seat state for landing and take off will be dictated by the design concept and associated CONOPS.

**Question 16: Can the 2,000 lbs be multiple independent pods, just structurally connected as a unit vehicle?**

Answer 16: The cargo area should be made up of one continuous volume.

**Question 17: Are there any required sensors (organic) on the platform?**

Answer 17: Any system and sensors you require to perform navigation and communication functions.

**Question 18: Can the submersible surface to discharge the occupants so they can go ashore? Or, does discharge have to occur underwater?**

Answer 18: Whether the submersible surfaces to discharge occupants is dictated by the design concept and the associated CONOPS.

**Question 19: Will the vehicle's design need to comply with existing LISN requirements for diving & life-supported deep submergence systems?**

~Ditto for aircraft standards?

~If yes, which ones? What parts?

~If "yes," this is a really big obstacle.

Answer 19: Compliance with existing military and civilian regulations will be dependant on the particulars of your design. Safety of the personnel in all phases of the mission remains paramount.

**Question 20: Is the 3-day loiter at the end of the 12nm phase of the mission?**

Answer 20: Yes. Reference Section 1.2.

**Question 21: Does the vehicle have to be subsafe?**

Answer 21: The governing safety standards are a function of the parameters for your particular design. Safety of the personnel in all phases of the mission remains paramount.

**Question 22: Are rated pilots required?**

Answer 22: The operating and manning requirements are a function of your particular design.

**Question 23: Are ships 'captains' required for surface and submerged operations?**

Answer 23: The operating and manning requirements are a function of your particular design.

**Question 24: Can a single company submit more than one proposal?**

Answer 24: Yes.

**Question 25: Clarify expectations regarding ingress/egress at entry/insertion point.**

- submerged?
- surfaced?

Answer 25: Ingress and egress (12 NMI each way) is to be submerged. The insertion/extraction of the crew can be at the surface or submerged. Reference BAA Section 1.2

**Question 26: Does Sea State 5 only apply to the loiter phase?**

Answer 26: Yes, reference BAA Section 1.2.

**Question 27: The platform is required to loiter in theater for up to 3 days, in sea state 5. Are there any sea state requirements during the transit stages?**

Answer 27: No, the maximum operating sea state during transit should be a function of your particular design.

**Question 28: At the team insertion point, is egress from the craft wet or dry? (i.e. is the craft submerged, beaches, or ashore?)**

Answer 28: That is a function of your particular design.

**Question 29: During the 3-day wait portion of the mission, is the craft submerged, anchored, maneuvering/evading, or ashore?**

Answer 29: That is a function of your particular design.

**Question 30: Are staged vehicles (e.g. detachable submersible section) viable concepts?**

Answer 30: No, a single platform must be used for all modes of operation.

**Question 31: Does 1 person in the 8 person team need to be a "pilot," or is the craft to be highly automated?**

Answer 31: Please refer to the answer to question 22.

**Question 32: Identify/Clarify environmental control system expectations/constraints:**

- temperatures
- pressure
- breathing medium
- etc.

Answer 32: That is a function of your particular design. The operating temperature, and pressures, can be above or below ambient conditions provided it can sustain human life.

**Question 33: Sea State 5 requirement: How long does SS 5 last?**

Answer 33: The loiter stage of the mission is 3 days. Reference BAA Section 1.2

**Question 34: Does entire cabin have to be dry for submerged phase?**

Answer 34: That is a function of your particular design.

**Question 35: Is there a max. altitude for the 100 NMi inbound phase?**

Answer 35: That is a function of your particular design.

**Question 36: The BAA mentions loitering in SS 5, but what about the landing, takeoff, and submerged operations?**

Answer 36: Please refer to the answer to question 15 and 26.

**Question 37: How shallow should the water be where operators disembark? Real shallow is difficult for my approach.**

Answer 37: That is a function of your particular design.

**Question 38: Are there specific customer drivers behind the 1000 NMi Air, 100 NMi surface, 12 NMi subsurface?**

Answer 38: This is a canonical mission that DARPA believes will help identify the key technology issues associated with this system concept.

**Question 39: Do you expect the proposal to define a baseline concept?**

Answer 39: See BAA Section 1.2.2.

**Question 40: What aspects of the vehicle can remain above water? (e.g. engines, snorkel...)**

Answer 40: That is a function of your particular design.

**Question 41: The submerged legs of the mission are short enough in duration to accomplish with a flooded hull fuselage with use of rebreathers. Rebreathers will likely also be used for submerged swim into shore. Is a "wet boat," like an SDV, acceptable?**

Answer 41: That is a function of your particular design.

**Question 42: You mentioned the possibility of keeping propulsion above the water line. Does DARPA have an exact definition of submersible? What has to be below the water line?**

Answer 42: That is a function of your particular design.

**Question 43: Regarding ambient condition vs. operational expectations, please amplify:**

~Sea State 5 (at or near surface)

~Which SS 5 standard? Seaman or Beaufort?

~Wind Speed?

~Operational Expectations?

- Landing
- Cruise speed
- Submergence
- Take off

Answer 43: Please refer to the answer to question 15 and 26.

**Question 44: What stage of the mission is the loiter performed at? (i.e. by 12 nm ingress is that 6 n miles in & 6 n miles out to loiter, followed by 6 n mi return to pick up operators & 6 n miles submerged cruise out before surface operation?)**

Answer 44: Please refer to the answer to question 18.

**Question 45: Do the occupants need to be deployed submerged or can the vehicle surface for deployment & return?**

Answer 45: Please refer to the answer to question 13 and 25.

**Question 46: Will there be a Sea State requirement for takeoff and landing (or 2 different ones)?**

Answer 46: Please refer to the answer to question 15 and 26.

**Question 47: What is the minimum # of people to be carried?**

Answer 47: Please refer to BAA Section 1.2.1.

**Question 48: Does the platforms have to be able to take off and land from both the water and a runway?**

Answer 48: Yes.

## **DARPA-BAA-09-06**

### **Questions and Answers**

Questions 1-48 were posted Nov 7, 2008. Solicitation questions (49 through 118) and answers are provided herein.

Question 49: Does the overall cargo capacity of 2,000lbs include or exclude the 8 operators and their weight, and what is considered their average body weight (excluding their gear)?

Answer 49: See answer to question 9.

Question 50: Is it expected that the 8 operators and or their (the) cargo be capable of being inserted and/or extracted while the craft is submerged and/or only above the surface simply while the craft is loitering?

Answer 50: Please refer to the answer for question 18.

Question 51: While the craft is loitering, for 3 days (72 hours), does it need to be in full operation with engines running at all times for the entire duration of the 72 hours and ready for instant "hot" take-off or can the engines be shutoff and only be ready with a cold start when needed for take-off?

Answer 51: The requirements for the loiter phase are detailed in section 1.2.

Question 52: Is there a mission relevant preference between "dry" and "wet" designs? Common sense and flexibility would suggest that a dry design is preferable however if the mission is standardized to, e.g., deploying a team of navy seals, the actual benefits of a dry design may not be worth the engineering trade-offs?

Answer 52: This is a function of your particular design; please refer to the answer for questions 28 and 34.

Question 53: Please comment on the relative merits of platforms that complete the round trip as one complete unit versus platforms that deploy/recover a separate minisubmarine.

Answer 53: Please refer to the answer for question 30

Question 54: The loitering design objective states the platform may be afloat in theatre for up to 72 hours between insertion and extraction of operators. Are there any concerns regarding concealing the craft during this time that should be factored into the concept?

Answer 54: The requirements for the loiter phase are detailed in section 1.2.

Question 55: If applicable, please advise on any other design constraints on the platform due to interoperability with other platforms (e.g., wingspan/height limitations for operation on an aircraft carrier, etc.)

Question 55: That is a function of your particular design.

Question 56: Is there a minimum set of requirements that define underwater maneuverability: speed (notwithstanding the requirement to complete a mission in the 8 hours specified), turning radius, ability to navigate through obstacles, minimum water depth, etc.?

Answer 56: That is a function of your particular design.

Question 57: Will the BAA-09-06 Administrator accept a "sub proposal" to support the awarded prime contractor?

Answer 57: The Government is interested in proposals which address the entire statement of work in the BAA. Individuals or companies with compelling solutions to part of the problem are encouraged to team with other companies/individuals.

Question 58: At this stage I am approaching you as a private individual, however, following informal consultation with other parties, envisage an initial core project team including myself plus current and former students and staff at the faculty of "a non-U.S. university". Please advise if this is acceptable under your contracting and security guidelines.

Answer 58: Eligibility information is detailed in BAA section 3.

Question 59: In the event a fully compliant proposal can not be submitted in time, would you be interested in the alternative approach of submitting a concept outline (at the level of detail of a patent submission) and using that as basis for further discussions and, subject to your positive feedback, detailing of the additional deliverables sought under the request for proposal?

Answer 59: If you can not submit a proposal on time, the BAA will be open for one year after the start date, although proposals submitted after the due date may or may-not be considered for additional awards. See Section 4.4.1.

Question 60: Is a coupled, two-body solution where both bodies have maneuverability in air, but only one has maneuverability in water allowed?

Answer 60: Please refer to the answer for question 30.

Question 61: Is a proposal acceptable that investigates the ability of a single vehicle to perform this mission, and compares this to a vehicle that has a submersible shell portion that is able to separate from the flight vehicle?

Answer 61: Please refer to the answer for question 30.

Question 62: Is a platform defined as an inseparable vehicle, or can portions of the system solution be separable and optimized for a portion of each stage of the mission?

Answer 62: Please refer to the answer for question 30.

Question 63: If a separable vehicle system can be shown to be superior to a single inseparable vehicle - why would this not be considered, especially if CONOPs were shown that show greater operational flexibility, robustness, survivability, and performance?

Answer 63: Please refer to the answer for question 30.

Question 64: What is the definition of “tactically significant” (range, loiter, time, payload, depth and speed)? Baseline reference point? Other information that might put this into better context?

Answer 64: The ranges specified under the BAA in section 1.2 are for a canonical mission developed by DARPA.

Question 65: In the concept evaluation phase of the project, would an investigation of a different mix of airborne/ surface/ subsurface operation be of interest to an end user?

Answer 65: The mix of airborne/ surface/ subsurface operation is defined in section 1.2 of the BAA.

Question 66: From a closed vehicle solution standpoint, would exploration of varying radius of action, payload, etc. be useful to the study?

Answer 66: The tactical radius and payloads requirements are given in the BAA in section 1.2.

Question 67: The desire for risk reduced technologies (weight, flow conditions, structures, wing geometry, and power generation/energy storage) is understood. Is there interest in demonstrating other technologies that might enable the viability of an underwater vehicle (i.e. man-machine, interface with other vehicles, sea state, ballast systems, etc.)?

Answer 67: A proposer should address the five technical area outlined in the BAA, but is also welcomed to discuss any additional technologies deemed relevant to the submersible aircraft effort.

Question 68: Can this project be used as an opportunity to support the analysis for a submarine based aerial platform?

Answer 68: Please refer to the answer for question 30.

Question 69: What sea state must the aircraft be able to takeoff and land in?

Answer 69: Please refer to the answer for question 15.

Question 70: Are there maximum size and weight restrictions?

Answer 70: All the restrictions for the platform are outlined in the BAA.

Question 71: Is the total range in the air 1000nm or 2000nm? Radius implies doubling of the 1000nm number, but the request says 1000nm total, which is it?

Answer 71: The multimodal range of the platform is 1224 nautical miles. Once the platform is refueled it is assumed that it can perform another 1224 nautical mile multimodal transit. Please refer to section 1.2 of the BAA.

Question 72: Is there a limit on the cost of the craft or is it purely performance based?

Answer 72: The evaluation criteria for this effort are detailed in section 5.1.

Question 73: Is there a maximum draft when submerged?

Answer 73: Please refer to the answers for questions 13, 42.

Question 74: Is there an age limit to this Submersible Aircraft design, and whether this must be designed as an autonomous or piloted craft?

Answer 74: Please refer to the answers for questions 22, 23.

Question 75: Max. and minimum depth of submerge in submarine mode?

Answer 75: Please refer to the answers for questions 13, 42.

Question 76: Max. and minimum altitude of the flight in the aircraft mode?

Answer 76: That is a function of your particular design.

Question 77: Type of the take-off to the action (from the carrier, from the water, from the land, from the air)?

Answer 77: The craft needs to be able to take off from and land on, both land and water.

Question 78: Type of preferred fuel?

Answer 78: That is a function of your particular design.

Question 79: Is the distance of 1,150 miles by air, 115 miles by sea and 14 miles underwater counted as a two-ways sum (1,150 m AND 115 m AND 14 m AND 3 days of the stand-by AND trip back) or as a maximum distance of the two-ways trip (1,150 m OR 115 m OR 14 m AND 3 days of the stand-by)?

Answer 79: The ranges are detailed in the BAA in section 1.2.

Question 80: The 8 hours of the trip is a time for 1,150 miles by air AND 115 miles by sea AND 14 miles underwater or 1,150 miles by air OR 115 miles by sea OR 14 miles underwater?

Answer 80: The ranges and time limits are detailed in BAA section 1.2.

Question 81: Are there any restrictions or expectations about the maximum and minimum speed in the air, on the water and underwater?

Answer 81: That is a function of your particular design.

Question 82: We are wondering if DARPA considers this solicitation to be best suited to large contractors or if small firms like ours could compete equally well. We do not have the resources to manufacture a full scale certifiable production aircraft. However, we could certainly design and plan the development of small scale prototypes for static or dynamic testing.

Answer 82: One does not have to be able to manufacture a Submersible Aircraft to be qualified to propose against this BAA. The deliverables for this solicitation are clearly documented in section 1.2.3.

Question 83: How many personnel need to be carried by this craft?

Answer 83: The answer is detailed section 1.2.1.

Question 84: Are there speed/altitude/range requirements for this craft?

Answer 84: The answer is detailed section 1.2.1, and also refer to the answer to question 76.

Question 85: Do the personnel need to be able to enter and exit the craft while it is submerged?

Answer 85: Please refer to the answers for questions 18 and 28.

Question 86: Does the interior crew compartment have to remain dry?

Answer 86: Please refer to the answer for questions 34.

Question 87: Can it be assumed the personnel are wearing breathing apparatus?

Answer 87: Please refer to the answer for question 41.

Question 88: Is a maximum 30 foot depth of submergence acceptable?

Answer 88: Please refer to the answers for questions 13, 14.

Question 89: Is snorkeling acceptable for the 12 NM submerged transit?

Answer 89: Yes.

Question 90: Is a 2 phase solution (1100nm / 12nm) that meets the timeline acceptable?

Answer 90: The requirements for the three modes of operation and their respective ranges are detailed in the BAA in section 1.2.1.

Question 91: Are detachable components acceptable provided they are recovered on the return transit?

Answer 91: Please refer to the answers for questions 30, 60, 61, 62, and 63.

Question 92: Are the slides or other information from the industry day available?

Answer 92: Industry day presentation and attendee list has been posted. Available at: <http://www.darpa.mil/sto/solicitations/BAA09-06/index.html>

Question 93: Is there a list of attendees from the industry day available, especially any firms interested in teaming?

Answer 93: Industry day presentation, attendee list, and teaming site are available at: <http://www.darpa.mil/sto/solicitations/BAA09-06/index.html> and <https://www.davincinetbook.com/teams/>.

Question 94: What is the expected duration, or range of the duration, for the effort to be proposed in the BAA?

Answer 94: There is no specified duration.

Question 95: What is the level of the effort being considered for the program, dollars?

Answer 95: There is no specified cost.

Question 96: Do the mission parameters in the BAA come from analysis of the technologies considered to date, and if so is this information available, or did the mission parameters come from the user community?

Answer 96: Please refer to the answer to question 38.

Question 97: The BAA states that the extraction can be considered complete once the surface transit is finished. Can we assume that a design option in which the vehicle jettisons flight hardware during the mission to reduce the overall structure and thus the weight of the vehicle is acceptable?

Answer 97: Please refer to the answer to question 12.

Question 98: The BAA defines the surface tactical radius as “flight near the surface of the water which may or may not leverage ground effect.” Are we to interpret surface transit as boat like transit on the water, low level flight, both, or either option?

Answer 98: That is a function of your particular design.

Question 99: Is the focus of this DARPA effort on the system design for the vehicle or on enabling technologies with system design of sufficient fidelity to generate requirements for the enabling technologies?

Answer 99: The later; the design needs to drive out the requirements for the 5 key technologies identified in the BAA and any others unique to your system concept.

Question 100: Is the apparatus to be reusable?

Answer 100: Please refer to the answer to question 5.

Question 101: Are multi-stage concepts permitted – for both the initial flight 1000nm portion, and the subsurface portion of the mission profile? In other words, can the vehicle consist of a various / multiple airborne and submersible stages?

Answer 101: Please refer to the answer to question 30.

Question 102: If so, do all of the stages need to be recoverable?

Answer 102: Please refer to the answer to question 30.

Question 103: If so, do the separated components need to be able to rendezvous within the expected operating regime / mission profile of the craft; or can they be recovered separately?

Answer 103: Please refer to the answer to question 30.

Question 104: Are ballistic concepts allowable – i.e. can we use a suborbital launch to get downrange – with either a separable or monolithic craft?

Answer 104: DARPA is not interested in ballistic approaches for this BAA.

Question 105: What environmental constraints or limitations are being required for:  
a. The flight portion at altitude – i.e., pressurized vs. unpressurized  
b. The submerged portion – i.e., wet interior vs. dry interior; ambient vs. pressurized?

Answer 105: These issues are all a function of your particular design approach. Please refer to the answer to question 32 as well.

Question 106: Are there any times when the craft must operate in a mode where no part of the craft (i.e. a snorkel) can break the surface? Or, are continuous snorkel / periscope operations permitted for the entire submerged portion of the mission profile?

Answer 106: DARPA has not placed a requirement that all elements of the system must be submerged for some portion of the mission.

Question 107: Does this craft need to operate in a hostile ASW type of environment; or is the ASW component of the operating environment expected to be relatively benign?

Answer 107: For the purposes of Phase 1 proposal the ASW environment is not a consideration. Phase 1 is focused on the 5 key technology areas identified in the BAA. If the contractor believes there are significant design drivers associated with the assumed ASW threat that should be discussed in the technical approach section of your proposal and in the work proposed.

Question 108: What is the maximum operating depth anticipated to be for this craft?

Answer 108: Please refer to the answer to questions 14, 19, 21, and 32.

Question 109: Are there any restrictions on the mode of energy / power generation?

Answer 109: Safety of operation and personnel in proximity to the propulsion system is the only constraint on the propulsion system energy source.

Question 110: Since there is no range requirement between insertion and extraction, loiter operations appear to take place at the place of insertion, however this appears to be counter to the desire to reduce vulnerability. Where do loiter ops take place?

Answer 110: That is a function of your particular design.

Question 111: Is it expected that someone will remain with the vehicle during loiter operations?

Answer 111: The operating and manning requirements are a function of your particular design.

Question 112: Is the pilot included in the 8 people specified in the BAA?

Answer 112: Please refer to the answer to question 22.

Question 113: What do you envision the reusability logistics are? In other words, if we were to propose using solid rocket propellant to achieve the 1000 nm endurance in air do we see this as acceptable?

Answer 113: Your design needs to be able to complete an entire mission with logistics in the field. Please refer to the answer to question 12.

Question 114: While in submerged mode do you envision the crew being in a pressure vessel or can the airplane be free flooding and have people on SCUBA?

Answer 114: This is a function of your particular design.

Question 115: What are your thoughts on a carrier craft that performs the 1000 nm mission and docks with a craft that performs the other missions?

Answer 115: Please refer to the answer to question 30.

Question 116: Once the craft is done with the mission is there a time requirement to return home? Is it in the CONOPS to have this craft sit there and be recovered from another craft so all the fuel is used on the mission?

Answer 116: After the mission is completed the platform can be resupplied but it will return under its own power independent of other craft.

Question 117: What is the maximum sea state for taking off and landing?

Answer 117: Please refer to the answer to question 15.

Question 118: What are the plans for a follow-on to build a prototype or subscale experimental version of the contemplated aircraft?

Answer 118: The follow on plans are dependant on the results of the proposed effort.