Questions from HACMS Proposers' Day

Q60: Is it appropriate for a submitter to propose only the first 18 months of the program, or should we propose the entire contract?

A60: Proposals should address/bid all 3 phases, 4.5 years, of the HACMS program.

Q59: Is an approach that uses formal-methods-based techniques to verify that the system under control (be it by the baseline or experimental controller) invariably remains within an application-dependent safety envelope within the scope of Technical Area 3?

A59: Yes, this approach is in scope.

Q58: DARPA-BAA-12-21 requires the proposer to submit a Subcontracting Plan in accordance with FAR 19.702(a) (1) and (2). FAR 19.702 (1) essentially states that if the awarded contract is expected to exceed $650K and has subcontracting possibilities, the successful proposer is required to submit an acceptable subcontracting plan. If the proposer is able to subcontract to companies in at least 2 or 3 of the categories (e.g. VOSB, SDVOSB, HUBZone, SDB and WOSB), but not all, would this be acceptable?

A58: FAR 19.702 states that "[a]ny contractor receiving a contract for more than the simplified acquisition threshold must agree in the contract that small business, veteran-owned small business, service-disabled veteran-owned small business, HUBZone small business, small disadvantaged business, and women-owned small business concerns will have the maximum practicable opportunity to participate in contract performance consistent with its efficient performance." FAR 19.702(1) further states that "[i]n negotiated acquisitions, each solicitation of offers to perform a contract . . ., that individually is expected to exceed $650,000 . . . and that has subcontracting possibilities, shall require the apparently successful proposer to submit an acceptable subcontracting plan." It does not appear that the relevant language from FAR has a requirement for the successful proposer to submit a subcontracting plan that includes all the various small business concerns.

Q57: Once HACMS is up and running, to what extent do Technical Area 1 performers need to receive and integrate technologies from multiple research-platform teams?"

A57: Technical Area 1 performers are required to support all the other performers. As stated in the BAA on page 9 "Technical Area 1 performers will work closely with the performers in the other Technical Areas, including educating other performers about the technical challenges in producing high-assurance versions of the vehicle, developing unrestricted and unclassified "challenge problems" that abstract the key difficulties for use by other performers, and applying the research results from the other Technical Areas to the development of the high-assurance vehicle." In addition, pages 6-7 of the BAA describes the Associate Contractor Agreement Clause which states: "Performers may have an Associate Contractor Agreement clause included in their award to facilitate the open exchange of information. This clause is intended to ensure appropriate coordination and integration of work by the HACMS contractors, while maximizing commonality and preventing unnecessary duplication of effort."

Q56: Are Technical Area 1 (Military Vehicle Expert) performer(s) required to physically deliver the defense vehicles to Technical Area 5 (Red Team) performer(s) for evaluation?

A56: No, Military Vehicle Expert(s) are not required to physically deliver the defense vehicles to the Red Team(s). They are only required to provide access to the defense vehicles as stated in the BAA on page 14.

Q55: In regards to both paragraphs of the Milestones section on page 14 of the BAA, will the Technical Area 5 (Red Team) performer(s) be required to travel to the Technical Area 1 (Military Vehicle Expert) performer(s) site to conduct the evaluation? How long will the Red Team(s) need to have access to the defense vehicles?

A55: Yes, the Red Team(s) will most likely be required to travel to the Military Vehicle Expert(s) site to conduct the evaluation. We do not anticipate the Red Team(s) to require access to the defense vehicles for more than one month at a time. In general, for budgeting travel, the Red Team should base their travel cost to the Military Vehicle Experts site as a cross-country trip.

Q54: Are UAV platforms within the scope of the program?

A54: Yes, UAV platforms are within the scope of the program. If the UAV platform is being proposed as part of Technical Areas 2, 3, and 4, it must satisfy the open-source vehicle requirements set forth in the BAA on page 8.

Q53: UAVs typically consist of two types of software systems: flight control and mission control. Flight control software tends to be closed source and very vehicle specific. Mission control software is more programmable and gets reprogrammed regularly by non-traditional programmers and is therefore more prone to errors and more vulnerable to cyber-attacks. Should the focus be on the mission control software?

A53: We are interested in all software running on the vehicle (i.e., flight control and mission control software systems).

Q52: The BAA states to use July 1, 2012, as an estimated start date for budgeting purposes on page 13. However, Figure 2 shows the program schedule starting in Q4 of 2012, i.e., on Oct 1, 2012. Which start date should be used?

A52: July 1, 2012 should be used. The program schedule on page 13 of the BAA is shown in Government Fiscal Year (GFY), which runs October through September. Accordingly, Q4 of GFY 12 begins on July 1, 2012.

Q51: Is it possible to submit a proposal that has two sub-proposals in the same Technical Area? In other words, although we submit a single proposal in which we are the Prime contractor, the proposal includes a 10 page Technical Area 2 proposal with company ABC as subcontractor, and another 10 page Technical Area 2 proposal with company XYZ as a subcontractor.

A51: Multiple technical approaches in the same Technical Area can be submitted. As stated in the BAA "If a proposer submits a proposal for one Technical Area, the maximum count for Volume 1 is 30 pages...For each additional Technical Area being proposed, the maximum count for Volume 1 is increased by 10 pages..." As such, page limitations are based on the number of Technical Areas proposed, not on the number of technical approaches per Technical Area. Therefore, if you are proposing to only one Technical Area, then all technical approaches for that Technical Area when added together cannot exceed 30 pages. If you are proposing to two Technical Areas, then all technical approaches for both Technical Areas when added together cannot exceed 40 pages. In addition, for multiple Technical Areas and/or multiple technical approaches for a single Technical Area in one proposal, each Technical Area/approach must be proposed as separate tasks in the Statement of Work and Cost Volume to allow for independent evaluation.

Q50: Would work which more fully emphasizes formal methods in the synthesis process fall under the purview of Technical Area 3?

A50: If the focus of the work is on operating system components, then it would fall under Technical Area 2. If it is on controllers that interact with the physical world, then it would fall under Technical Area 3.

Q49: Does the application of runtime verification and control for the production of (runtime-) verified operating systems, with a focus on file and storage-stack systems, fall under the purview of Technical Area 2, or is DARPA more interested in the use of synthesis tools and the generation of accompanying proofs?

A49: Any technique that produces a proof of correctness in addition to the actual code is in scope. If runtime verification produces a proof, then it is in scope.

Q48: Can a company be a subcontractor on two separate prime contract proposals?

A48: As long as there is no conflict of interest (COI). The Prime contractor's proposals should address how this use of the same subcontractor is not a conflict of interest or how the risk of an actual or perceived conflict will be mitigated. The proposals should also confirm the subcontractor is not double proposing the same level of effort from the same resources (i.e. there must be evidence from the proposals that if both are awarded, the subcontractor can handle both efforts).

Q47: Is the scope of HACMS limited to code synthesis-based approaches to building high assurance embedded systems?

A47: Any technique that produces provably correct code is in scope.

Q46: The bulleted list of "anticipated research challenges" on pages 10-11 appears to us to be equally applicable to both operating systems (TA2) and control systems (TA3), however the BAA states them all in TA2 section, and only repeats the very first one in the TA3 section. Should we take this as an indication that DARPA would prefer that these research challenges be addressed in context of TA2, or would addressing these challenges in context of TA3 be of equal interest to DARPA?

A46: No. If the proposer feels that an "anticipated research challenge" listed under TA2 can also apply under TA3, they are welcome to address that challenge in the context of TA3, so long as it is adequately described in the proposal. As stated in the BAA, the proposer is reminded that these research challenges are "anticipated", "are not limited" and "individual proposals need not address any or all of these challenges."

Q45: In Figure 2 on p 13, some of the TA1 and TA4 milestones are annotated with "(2)" - what is the significance of this annotation?

A45: It indicates that the program as a whole would like to study at least two vehicles in TA1 and two vehicles chosen by the performers in other technical areas.

Q44: The TA4 deliverables are described on page 15 without relating them to the two subareas of TA4. Do we understand correctly that the first and second sentences of the TA4 paragraph on page 15 are meant to correspond to the first and second subareas of TA4 respectively?

A44: Yes.

Q43: For Technical Area 1 (Military Vehicle Experts), do the proposed defense vehicles have to be ground-based systems?

A43: No. The proposed defense vehicles for Technical Area 1 can be any form of manned or unmanned ground, air, or water vehicle system, as long as the vehicles comply with the requirement on pages 9-10 in the BAA under “Technical Area 1: Military Vehicle Experts”.

Q42: For Technical Area 1 (Military Vehicle Experts), is there a preference for emerging defense vehicles versus current defense vehicles?

A42: There is no preference.

Q41: Following up on FAQ questions 8 and 36 and section III.D.1 of the BAA, can separate research groups inside a single large business submit separate proposals as prime contractors?

A41: Yes, separate research groups inside a large business represent separate entities and, thus, each research group is allowed to submit their own individual proposal as a prime towards Technical Areas 1-5. However, the single business as a whole is considered one organization and as stated in the BAA "proposers selected for Technical Area 5 (Red Team) cannot be selected for any portion of the other four Technical Areas, whether as a prime, subcontractor, or in any other capacity from an organizational to individual level." For example, if three different research groups from the same business submit proposals for Technical Areas 1-5, there can be either one Technical Area 5 award granted to the business or one or more Technical Area 1-4 awards granted to the business.

Q40: I am looking to make an unclassified submission, where should I look to find that information?

A40: Please refer to sections IV.D.2.a. (Procurement Contract or Other Transaction Agreement Proposers) and IV.D.2.b. (Cooperative Agreement Proposers) of the BAA. Please note that these sections have been updated in the "Amendment 1" copy of the BAA document, which was posted to FedBizOpps and Grants.gov on March 1, 2012.

Q39: Will HACMS support existing CAN protocols?

A39: HACMS will support whatever protocols are necessary to build high assurance versions of the military vehicles provided by TA1 performers and the open-source vehicles chosen by TA2-TA4 performers.

Q38: Where can I get copies of the presentations given at the HACMS Proposers' Day?

A38: http://www.darpa.mil/Our_Work/I2O/Programs/High-Assurance_Cyber_Military_Systems_(HACMS).aspx. See the links on the right side of the webpage under "Additional Information".

Q37: Do proposals that include more than one Technical Area need to separate SOW tasks and costs by each technical area?

A37: If proposers submit multiple Technical Areas in one proposal, each Technical Area must be proposed as separate tasks in the Statement of Work and Cost Volume.

Q36: Does the rule "you cannot participate on TA5 if you are proposing on any other technical area" apply to separate research groups at a university?

A36: First, there is no rule that states you cannot propose to all five Technical Areas. Second, separate research groups at universities represent separate entities and, thus, each research group is allowed to submit their own individual proposal towards Technical Areas 1-5. However, the university as a whole is considered **one organization** and as stated in the BAA "proposers selected for Technical Area 5 (Red Team) cannot be selected for any portion of the other four Technical Areas, whether as a prime, subcontractor, or in any other capacity from an **organizational** to individual level." For example, if three different research groups from the same university submit proposals for Technical Areas 1-5, there can be either one Technical Area 5 award granted to the university or one or more Technical Area 1-4 awards granted to the university.

Q35: Technical/Management volume instructions for cost summary states "Provide the cost summary as described in Section IV.C.2.b.". Please clarify as we seem to be missing that part.

A35: The Cost Summary is actually located in Section IV.B.2.b. of the BAA document.

Q34: What role do you see for model-based design (i.e., Simulink, SCADE, UML)?

A34: Model-based design is relevant.

Q33: What role do you see for dynamic reconfiguration (i.e., failure recovery and reconfiguration; re-verification of safety and security properties under reconfiguration)?

A33: Dynamic reconfiguration is relevant. One of the key challenges is developing control systems that are resilient in the face of attack; therefore, reconfiguration would be one strategy that is consistent with that.

Q32: Is there a specific government transition partner identified for this technology?

A32: No.

Q31: Will DARPA perform Red Team duties or will there be a separate contractor performing Red Team duties?

A31: Technical Area 5 is responsible for performing the Red Team duties.

Q30: Can we propose to be the "Red Team" or be part of it?

A30: Yes, you can propose to be the Red Team. Yes, you can propose to be part of it if you can find someone else to do the other part.

Q29: Are software simulated platforms acceptable research/demo vehicles (versus actual hardware)?

A29: Hardware is preferred. If for some reason, a simulated platform is the only viable option, DARPA is open to that as a possibility. The proposer must make the case in their proposal why a simulator would be a better option.

Q28: Are Technical Areas exclusive – can a single proposal address more than one?

A28: Yes, a single proposal can address more than one Technical Area. Refer to the BAA for further information.

Q27: Will DARPA consider team proposals that address multiple topic areas?

A27: Yes

Q26: If parts of such a proposal are of interest, would DARPA consider asking us to rebid a portion of interest?

A26: DARPA does not anticipate asking proposers to rebid, but does reserve the right to contract only parts of the proposal. Refer to the BAA for further information.

Q25: Can an organization be both a prime on a Technical Area 3 proposal and a sub on a Technical Area 1 proposal? Would such arrangement make sense from a DARPA point of view, or should we instead wait for the DARPA to compose teams from different proposals?

A25: Yes, an organization can be both a prime on one Technical Area and a sub on another Technical Area other than Technical Area 5. Participants in Technical Area 5 cannot partake in any of the other technical areas. Yes, this arrangement may potentially make sense. It is up to the proposer to figure out if they want to form teams in advance or wait for the program kick-off to get formed into larger teams.

Q24: How many Technical Area 5 performers will be selected for contract?
A24: One or more awards are anticipated.

Q23: How will Technical Area 5 performers be evaluated at proposal stage?
A23: Refer to the BAA section on "Evaluation" for further information.

Q22: How will Technical Area 5 performers be evaluated during program execution?
A22: The same way as Technical Areas 1-4 performers. The Red Team will not be evaluated on whether they are successful at breaking in, but instead be evaluated on the approaches they took to break in, the thoroughness of their analysis, and the tools they used.

Q21: Do Technical Areas 1-4 teams provide tools and models to Technical Area 5 teams?
A21: Yes. Refer to the BAA for further information.

Q20: Are Technical Area 5 teams expected to target protected data and data links (i.e., crypto)?

A20: Technical Area 5 performers are expected to target the systems constructed by Technical Area 1-4 performers.

Q19: Are companies prohibited from bidding Technical Area 5 and the other Technical Areas? Or do they need to be firewalled?
A19: No, proposers are not prohibited from bidding to Technical Area 5 and the other Technical Areas. However, proposers will not be awarded contracts in both Technical Areas 1-4 and Technical Area 5. Refer to the BAA for further information.

Q18: If submitting to more than one Technical Area, do we need separate proposals?
A18: No. Refer to the BAA for further information.

Q17: Are Technical Areas 2 and 3 teams expected to pick a particular platform to focus on, or can they propose more generic functionality and rely on other Technical Areas to target a specific platform?
A17: Proposers submitting to Technical Areas 2 and 3 should pick a particular open-source vehicle to work on as part of their proposal. Refer to the BAA for further information.

Q16: Will each proposer need to buy a UAV? Or will Technical Area 1 provide them on teams they're assigned to?

A16: To focus program efforts, program performers will apply the developed tools and techniques to a variety of vehicles. These vehicles will include:

1. Defense systems identified by the military vehicle experts (Technical Area 1),
2. "Challenge problems" created by the military vehicle experts to capture key technical problems in the defense systems in an unrestricted, unclassified version available to all performers, and
3. Various open-source vehicles.

Proposers submitting to Technical Areas 2, 3, and 4 must select and specify the open-source vehicle(s) they intend to work on. Pricing for the open-source vehicle(s), as well as any required technical support activities, should be included in the proposal. Refer to the BAA for further information on what constitutes an open-source vehicle.

Q15: If performers can choose any open-source platform of their choice, how will integration be feasible?

A15: It depends on how the proposals come in and what they are focused on. It may be that each team works on their own platform, or if there are a lot of people proposing different platforms, DARPA will reshuffle teams to work on a smaller set of platforms. Any platform or other proposal changes will be discussed with selectees during negotiations.

Q14: Will Black-I Robotics open its code to Phase I recipients?

A14: Yes.

Q13: Can a CANbus connection be used on the LandShark?

A13: Yes.

Q12: Do we plan to tackle the problem of network protocols that exist on SCADA systems being inherently insecure? In other words, are new protocols proposals an interesting area to propose on?

A12: Communication networking protocols for vehicles are in scope. Supervisory Control and Data Acquisition (SCADA) systems are not in scope.

Q11: Will the attendance list and contact info for this industry/Proposers' day be published?

A11: Yes. If you opted to have your information shared when you registered for Proposers' Day then your information will be published.

Q10: You mentioned a mix of 6.1 and 6.2 funding. How will this mix be determined? Will there be a mix on each contract?

A10: It will be determined on a case-by-case basis.

Q9: If proposers identify synergizes with other groups, could/should they express them in the proposal?

A9: Yes. In general, proposers should include any information that will allow DARPA to better evaluate the strengths of their expertise and knowledge base, provided that it is within the page limits.

Q8: Can proposers submit multiple proposals w/o limits – individual or institutional?

A8: Yes.

Q7: If using a UK academic on a team as an SME, what documentation is required on the proposal?

A7: Refer to BAA for further information.

Q6: Could proposals be for multi-robotic systems, or is this out of scope of the BAA? Not only would the network be the attack vector, but the target of the attack as well as all the components and module that depend on it.

A6: Yes, multi-vehicle systems are in scope.

Q5: Are platforms with Field-Programmable Gate Arrays (FPGAs) or FPGA + Central Processing Units (CPUs) of interest?

A5: Both are of interest.

Q4: For the security of control systems does the program look at the security of the software that implements the control or at new control design methods that are robust to attack when they occur. This means to re-design the basics of control law and not only the SW that implements them. Is this the objective of the program?

A4: The goal of the High-Assurance Cyber Military Systems (HACMS) program is to create technology for the construction of *high-assurance,* cyber-physical systems, where high assurance is defined to mean functionally correct and satisfying appropriate safety and security properties. Both techniques described in the question seem to be perfectly good approaches to improving the high-assurance nature of control systems.

Q3: Is hardware trust assumed?

A3: Yes.

Q2: Is this program only concerned with software generation, or is firmware generation, e.g. for FPGAs, within the scope of the program?

A2: Both software and firmware generation are within the scope of the program.

Q1: Are approaches that attempt to reduce verification complexities from the software domain to the hardware domain appropriate?

A1: Yes.