

**Autonomous Aerial Cargo Utility System Innovative Naval Prototype (AACUS INP)  
Industry Workshop 1-2 NOV 2011**

**Questions & Answers**

**15 NOV 11**

**Q1:** Is the program objective to focus on all weather and if so do you see the answer to be a suite of different sensors?

**A1:** No technology can truly fly in ALL weather. We want an AACUS-enabled aircraft to fly in conditions that exceed the current capabilities of manned aircraft.

**Q2:** Can you assume you have pre existing GPS maps of the area?

**A2:** You can expect to have current state of the art onboard digitized maps, which are neither comprehensive, particularly for remote areas, or at the resolution needed for precision operations.

**Q3:** What do you mean by “3 different interfaces”?

**A3:** In terms of communications with an airborne AACUS-enabled aircraft, there should be two different interfaces. One should communicate with an air operations center, providing mission-level interaction capabilities (much like today’s ground control stations). The second should be for a user on the ground with no special expertise, with a small form factor interface. The third should be the interface between the vehicle after it lands and the people on the ground (i.e. communicating when it is safe to approach, etc.)

**Q4:** Are you concerned with Airspace Deconfliction and national airspace concerns for AACUS?

**A4:** No. AACUS is an Innovative Naval Prototype (INP), focused on Science & Technology. In addition, not enough funds are allocated in order to incorporate Airspace Deconfliction.

**Q5:** The budget of 13 million per year, was that for all the follow-on years? Does that include cost of vehicles for the demo?

**A5:** There is roughly \$75M for the program, which includes the cost of the vehicles.

**Q6:** What type of terrain do you expect for the AACUS demonstrations?

**A6:** As bad as could possibly be expected including swamp, desert, rugged, marshy, rocky, trees, obstacles, steep and mountainous terrain, etc.

**Q7:** What do you mean by open architecture, does it imply open interfaces?

**A7:** We mean that the Government must be able to take this sensor package and plug into another vehicle without having access to flight control software. The winning team will be setting a standard for this kind of interface.

**Q8:** Will ONR, NAVAIR or some other organization need to certify the platform(s) prior to each demonstration?

**A8:** Not initially, since AACUS is an INP. As we get closer to end of the program we will start looking at certification processes.

**Q9:** Is AACUS involved with shipboard operations; is there a sea state level specified for sea-based launch and capture?

**A9:** Not explicitly. A new program SALTI (Shipboard Automated Landing Technology Innovation) will focus on shipboard operations.

**Q10:** In terms of the mission control individual, there is a grey area between deconfliction and active control of landing location. Should the mission control person pilot the vehicle or should there be as much autonomy as possible?

**A10:** There should be as much autonomy as possible, with no human controlling the vehicle in the traditional piloting role, this should all be goal-based control. The system should support a conversation with person on the ground.

**Q11:** What will be the focus on SBIR & STTRs for AACUS?

**A11:** More advanced long term concepts and capabilities such as CASEVAC missions. Send Dr. Cummings your ideas for future SBIR/STTRs to consider.

**Q12:** Do you have a specific location/facility selected for Demonstration and testing of AACUS?

**A12:** It is up to the selected team/performers to decide how and where to test. Testing may be conducted at local test facilities initially and eventually at NAVAIR PAX River Maryland Test site (or other government sites) for more mature testing. Demonstrations are increasingly difficult, but testing does not have to take place at the same site.

**Q13:** Is there an expectation that demonstration will be on both platforms?

**A13:** Yes, two different aircraft.

**Q14:** What is the vision for first demo?

**A14:** The first demo is to integrate and demonstrate the sensor package and associated interfaces on a single aircraft in static but realistic conditions.

**Q15:** Are there aspects of the CONOPS that are not expected to be fully demonstrated or even included?

**A15:** Yes, shipboard operations, cargo loading and unloading, and deconfliction with other aircrafts.

**Q16:** You mentioned Sense and Avoid is out of scope for this program, although it is mentioned in the CONOPS. What about sensing threats such as enemy fire or being pinged by a radar?

**A16:** The CONOPs are a story to fuel your imagination, and are not specific design criteria. The vehicle must sense and avoid enemy fire, but fire protection for people on ground is out of scope. This would be a great derivative topic for an SBIR and STTR.

**Q17:** Is Earned Value a requirement on the program (due to program size)?

**A17:** Yes

**Q18:** Is AACUS mostly focused on “landing site selection”?

**A18:** Selection is part of the problem, execution to land is just as important.

**Q19:** Do you envision a “man in the loop” making the final selection for landing; would it be an assisted landing or do you anticipate autonomous approach?

**A19:** The human on the ground should communicate expectations to the vehicle but in no way should the human give flight guidance. There should be no flight control guidance to the UAS other than higher level goal-based direction. We anticipate an autonomous approach with only supervisory human control.

**Q20:** Should the vehicle be capable of full landing zone assessment?

**A20:** Yes with override capability from a human on the ground and from the operations control station for the actual landing site chosen.

**Q21:** Is there a particular standard being followed for the open architecture framework?

**A21:** No. SNAP will be GFE and can be used. SNAP link: <https://snapteam.org> Other standards sources include OSD UCS WG, STANAG 4586.

**Q22:** The fact sheet mentions obstacle and threat avoidance with “aggressive maneuvering”. Does the AACUS solution include control systems as well as landing zone assessment and selection i.e. what does AACUS encompass in terms of the avionics solution?

**A22:** The teams should figure out the details. It should have a suite of avionics, not just LIDAR, and should leverage existing flight control algorithms.

**Q23:** Is it expected to develop and conduct simulations?

**A23:** Yes. Expected and recommended

**Q24:** How will the system be tested?

**A24:** The system test plan should be included in the proposal.

**Q25:** Should emergency procedures be developed?

**A25:** The system is expected to handle contingencies. Emergency procedures and contingency plans need to be addressed as part of any demo for basic safety of flight. In addition, dynamic contingencies that require significant replanning will be required in the later demonstrations.

**Q26:** LZ question regarding the foot soldier. Will every person on ground hold an HCI device/light weight device?

**A26:** Possibly. It is generally expected that in the future (5-10 years), all ground personnel will have some form of communication that could be deemed as a human computer interface.

**Q27:** What is the duration and budget of the program?

**A27:** \$75M, 6 years.

**Q28:** First flight date?

**A28:** 18-24 months from kickoff of the program.

**Q29:** Who to provide a WBS?

**A29:** Performers

**Q30:** What is the limit size of the proposal?

**A30:** 25 pages for just the technical portion.

**Q31:** Why is there going to be one single team award?

**A31:** We are examining both single and two team award options. The determination will be made when the Continuing Resolution is addressed.

**Q32:** What is the size of the vehicle you would like to see?

**A32:** Two full scale vehicles, Rotorcraft and/or VTOL, would be ideal. However, risk mitigation is also an important consideration so depending on the team capabilities, it may be smarter to do the first demo on a scaled down version of a vehicle. RMAX is not a candidate platform. Given that this is an INP, we would like the proposals to push the envelope.

**Q33:** After first two years of the program will there be one year option periods?

**A33:** Yes. FY14,15, 16, & 17 are one year options.

**Q34:** At the end of the INP, who owns the product?

**A34:** This will be worked out prior to the signing of the contract in terms of the actual hardware. All deliverables including the mission level open architecture software that allows the sensor suite to be deployed across different vehicles will be government owned, as well as the Human Machine Interface (HMI) and sensor suite designs, and a final cost benefit analysis that examines the open architecture trade space across different vehicle types.

**Q35:** Could one VTOL be different model platforms, or two different platform providers?

**A35:** What do you think the Marine Corps would like? They want to see different platforms.

**Q36:** Can FFRDCs, government labs and Foreign Nationals compete for AACUS?

**A36:** Yes. There is no foreign national requirement for AACUS, you just need to be ITAR compliant. FFRDCs can compete as well and directions will be stated in the BAA.

**Q37:** Will GOV GFE be available?

**A37:** Yes. The SNAP environment. Possibly government-owned helicopters from NAVAIR or AMRDEC, but this would need to be worked out with each individual organization.

**Q38:** What kind of sensor(s) are being considered? What sensors have been identified for potential solutions?

**A38:** We have not identified any specific sensors. This is up to the performers.

**Q39:** Is the test/demo range going to be government furnished or do we need to include that in our cost?

**A39:** Performers need to include that in their cost.

**Q40:** Flight test demonstrations are an excellent means to rapidly mature key technologies. However, flight tests using subscale platforms let us focus on technology development and limit the platform costs. Do you intend to tailor the evaluation criteria to address flight test technology demonstration achievements equivalently regardless of platform scale?

**A40:** The evaluation criteria will be the same regardless of platform scale. However, individual capabilities of the demonstration platform and associate technologies will be taken into consideration.

**Q41:** Along a similar vein, the costs associated with the use of full scale test platforms is obviously a concern. Have you considered separating the platform flight test elements from the technology development aspects of the program, essentially dividing the program into two major elements? This would enable the platform providers to bid on what they do best, and thereby ensure that you receive a preferred full scale demonstration platform(s) at a competitive and managed cost. Similarly, separating the technology development effort will also improve the

likelihood that you will secure a quality contractor team focused entirely on maturing the key technologies.

**A41:** How the proposing team chooses to structure their approach is up to them. However, the platform providers cannot work independently of the sensor developers so it is expected that there will be close cooperation between all members of the team.

**Q42:** What contract type do you plan to use (e.g. CPFF, CPAF, FFP, etc.)?

**A42:** Cost Plus Fixed Fee

**Q43:** Do you foresee GFE/GFI in addition to SNAP? For example, communications equipment might be available from Pax River should their test facilities prove to be attractive.

**A43:** At this time, there is not planned GFE other than SNAP. However, since government labs are permitted to team with companies under this proposal, adding agencies like those at Pax River who may have desired equipment is encouraged if such a relationship is beneficial to the overall program goals.

**Q44:** If we are able to identify GFE that could be used to support our AACUS program, for example an available Government flight test asset, how should we capture those costs in our BAA response?

**A44:** As you would for any subcontractor.

**Q45:** Do you envision that any portions of the AACUS program will be classified? If so, at what level?

**A45:** At this time, no. However, should a team have a classified aspect of their proposal, they should identify this as early as possible so appropriate accommodations can be made.

**Q46:** Are you still on track to perform a site survey of the facilities at Pax River?

**A46:** Yes, but it is not clear when such results will be available.

**Q47:** If Pax River or other Government facilities are available for use in support of the program, are you going to be able to identify what level of support, if any, will the Navy provide?

**A47:** This is up to the potential performers to determine given that government laboratories and centers can participate.

**Q48:** Do you intend to provide guidance as to your preferred environmental conditions (e.g. terrain, day/night operations, fog, dust, etc.) for the flight test demonstrations?

**A48:** Yes. The first demonstration is expected to occur in daylight conditions with moderately difficult terrain to negotiate (including obstacles and constrained landing environments.) In this first demo, the environment is not expected to change. Each of the three subsequent demonstrations are expected to get progressively harder, concluding

in a scenario where both aircraft are flying under adverse, dynamic conditions. Potential performers should propose what they envision to be an effective demonstration scenario in the proposal.

**Q49:** Are you planning to coordinate access to users and subject matter experts in cargo and CASEVAC operations during program execution, or will that be up to us?

**A49:** It will be up to the performers to gain such access but the AACUS program office will attempt to facilitate such requests and interactions as much as possible.

**Q50:** Have you identified your intended program deliverables?

**A50:** These will be detailed in the pending BAA.

**Q51:** Where do you intend to post the Industry Day Workshop presentations?

**A51:** These should be available by the 17<sup>th</sup> of NOV.