N251-003, ACV Improved HVAC System
Common Questions from SBCs

1. Q. What is the allowable space claim of the HVAC unit?
   A. The dimensions below are for the unit itself, not including distributed systems associated with the unit (e.g. ductwork, electrical harnesses, refrigerant lines, etc.). Note: a smaller space claim is highly desirable:
      i. 16” (depth)
      ii. 43” (length)
      iii. 35” (height)
2. Q. What power is available for the system?
   A. 3.2 kW (Threshold), 2.8 kW (Objective)
3. Q. What is the vehicle’s electrical bus voltage?
   A. Nominally 28.5VDC, IAW MIL-STD-1275E.
4. Q. What is the system’s allowable weight?
   A. 450 lbs. Lighter weight is desirable.
5. Q. What is the required heat output of the system?
   A. 90,000 BTU / Hr
6. Q. Is ductwork for air distribution required?
   A. Relative consistent temperature levels across all occupied positions, and within an occupied position (i.e. temperatures at the head and feet levels) are the desired outcome, how that goal is reached is up to the bidder’s proposed solution.
7. Q. Are there any exterior noise level requirements?
   A. Not as part of this SBIR.
8. Q. What are the main issues with the current system?
   A. Note: these are not listed in any order of priority
      i. Impacts on vehicle maintainability
      ii. High noise levels
      iii. Poor consistency of temperature levels across occupied stations and within occupied stations
9. Q. Does the solution have to consist of a single unit, or is multiple, smaller units acceptable?
   A. The technical approach for a best-balanced design for the HVAC is up to the bidder. Pros and cons of single vs. multiple systems would have to be identified, prioritized, and assessed.
10. Q. Where is there room for ductwork?
    A. To fully understand the space constraints for ductwork would require measurements on a current vehicle, or models or drawings. Access to these are expected to be available during Phase I.
11. Q. Is use of alternative technologies to achieve the heating and cooling requirements acceptable?
    A. The technical approach for a best-balanced design for the HVAC is up to the vendor. Any solution should consider performance, cost, weight, reliability, technology readiness level, space claim, etc.
12. Q. Is the current system engine driven?

A. The current system incorporates an engine-mounted compressor. Vehicle electrical power is provided for HVAC power and signals. Engine coolant is provided for heat transfer.

13. Q. Is the system in the engine compartment?
    A. Bulk of the system is in the occupied spaces of the vehicle interior.
14. Q. What are the maintainability issues with the current system?
    A. The vehicle's engine is removed frequently to facilitate maintenance on the vehicle. This requires disconnection of the refrigerant lines and capturing the refrigerant, then subsequent re-connection of the lines and charging the system, which significantly extends maintenance times.
15. Q. Does the system require a means of preventing or handling water ingestion?
    A. The exterior intake for the HVAC does address water ingestion to some extent, however the HVAC unit itself would likely require further water separation from the airflow.
16. Q. Is the HVAC system the highest contributor to vehicle noise levels?
    A. The HVAC is a significant contributor to vehicle noise levels, particularly at lower vehicle speeds (drivetrain and road noise contribute at some point). Desire is for the HVAC system to meet noise requirements in MIL STD 1474; the HVAC's noise, when combined with other vehicle noise sources, should not exceed single hearing protection levels. Marine Corps Order "MCO 6260.3A Marine Corps Hearing Conservation Program" provides additional guidance on determining at-ear noise levels when wearing hearing protection.
17. Q. Are there desired refrigerant types?
    A. The technical approach for a best-balanced design for the HVAC, including the selected refrigerant, is up to the bidder.
18. Q. Is Nuclear, Biological, Chemical (NBC) filtration required?
    A. Negative. Filtration for the ACV-30 variant mentioned in the SBIR is related to removing toxic fumes created from weapons firing.
19. Q. If there is a site visit (mentioned in Phase I), where would that be?
    A. Assume Virginia, within 40 miles of Quantico MCB.
20. Q. Is an "independent" or an "integrated" design preferred?
    A. An integrated approach is preferred, that considers impacts on vehicle maintenance, integration w the vehicle's CAN bus, space impacts on personnel spaces & egress passages, routing of distributed systems, etc.
21. Q. How is condensate handled with the current system?
    A. A drain line routes condensate from the HVAC into the vehicle's bilge area, where it can be pumped overboard using the vehicle's bilge pumps.