

Rotorcraft Situational Awareness Radar

The U.S. Army Contracting Command – Aberdeen Proving Ground, Research Triangle Park Division, on behalf of the U.S. Army Research Laboratory (ARL), Sensors and Electron Devices Directorate (SEDD) is soliciting proposals for the Degraded Visual Environment Mitigation program against the ARL Core Broad Agency Announcement (BAA) for Basic and Applied Research W911NF-12-R-0011. The topic area is 1.2.15 “Millimeter-wave and Sub-millimeter-wave Sensor Technology” for radar to support collision avoidance around a helicopter and the detection of incoming hostile fire. ARL is soliciting proposals under this Special Notice of the Broad Agency Announcement (BAA) for the performance of applied research to focus on a single demonstration radar which can be tested in a realistic environment.

There has been a significant investment made by various government organizations in forward-looking radar for helicopter landings in degraded visual environments (DVEs). These radars are typically required to have very good angular and range resolution in order to provide detailed terrain maps to identify suitable landing zones and detect hazards several hundred meters in front of a moving aircraft. This Special Notice does not address that topic, but rather, ARL is seeking the development of a small form-factor radar with wide angular coverage and limited detection range. It is envisioned that this radar could be one of several such units mounted around the aircraft which would complement the forward looking sensor by providing spherical situational awareness. The size, weight, power and cost of the proposed sensor architecture are of critical importance. There are no fixed requirements for these items, however, the applicant should consider them seriously when developing a radar design. Novel antenna / transceiver approaches are sought which will provide wide angular coverage while at the same time having angular resolution sufficient to detect objects around the helicopter. The discrimination of objects on the ground is not the goal. Rather it is to detect moving and stationary objects that could collide with the rotors, tail or fuselage. Examples include walls, trees, poles, wires, other aircraft, terrain, towers, etc.

The aviation community places great importance on multi-function sensor capability. Adding a hostile projectile detection capability to a collision avoidance radar puts requirements on a radar that may seem counter to its design. Small, inexpensive collision avoidance radars are by their nature unlikely to detect small projectiles at a significant range. They might, however, provide some information which supports other on-board hostile fire detection systems. The applicant should address the maximum transmit power feasible in their radar architecture and the ability of the system to accommodate both modes to collect collision avoidance and hostile fire data in rapid succession or simultaneously.

Notional specifications for a collision avoidance mode for the radar are that it detect a -10 dBsm target at a range of 50 m, have an azimuthal coverage of 135° and an elevation coverage of 90° . The angular resolution across this wide field of regard should be better than 5° in azimuth and elevation. The range resolution should be on the order of 0.5 m. Detections within this volume should be updated/recorded at a rate of at least 10 Hz. These are notional specifications based on previous field test data, however, ARL will consider alternative approaches proposed by applicants.

A proposal need not include a sophisticated software interface or a notional cueing interface to a pilot. Integration with an aircraft avionics system is not required. The goal is to develop an experimental radar that demonstrates novel antenna/transceiver technology which ARL can use to collect data in a realistic test environment. A highly integrated processor is not required but is certainly welcome assuming that ARL is able to access and record the digitized data stream prior to processing. Data processing and recording using a standalone computer system is acceptable if the detection update rate is sufficient. Consideration should be given by the applicant to FCC and NTIA spectrum regulations with regard to airborne radar systems. This is especially true given the large commercial potential of this technology. As drones and autonomous aircraft become more prevalent, the need for these systems grows. Preventing collisions between commercial aircraft and drones will most likely require radars of this type.

The total amount available for all awards is anticipated to be approximately \$800,000.00. Funding is currently available for up to two (2) Cooperative Agreements valued at no more than \$400,000.00 each to be awarded related to the Degraded Visual Environment Mitigation program, however, the Government reserves the right to make no award(s) based on the proposals received from this Special Notice. Each award will have a period of performance between nine and twelve months. While the ARL BAA and Topic remain open for proposal submission until 31 March 2017, in order to be eligible for an award under this Special Notice, a proposal must be received in accordance with the due dates and instructions provided in this announcement. An award will be pursuant to 10 USC 2358 Research Projects.

In order to be eligible for a Cooperative Agreement to be awarded with the FY2016 funding for this program, applicants are to submit proposals in accordance with the submission instructions under BAA W911NF-12-R-0011-04 no later than 24 February 2017 at 11:59 PM (EST). There is no page limitations when submitting against the BAA, however, under this Special Notice, the Technical section of a proposal will be limited to twenty (20) pages or less. Any proposal that exceeds the twenty (20) page limit will not be evaluated. Proposals will be evaluated using the criteria listed in the BAA. Once an applicant submits a complete proposal, the applicant shall notify the point of contacts listed below via email and provide their Grants.gov submission tracking number. Under this Special Notice, no formal Q&A will take place.

If an applicant has a general and/or clarification technical question related to this Special Notice, contact Mr. David Wikner at david.a.wikner.civ@mail.mil. For general Cooperative Agreement related questions, contact Mr. Brandon Hill at Brandon.s.hill24.civ@mail.mil. This special notice expires 24 February 2017 at 11:59 PM (EST).