Request for Information (RFI)
AFRL/PKV RFI 06-02

Rotary Wing Brownout Sensor Technologies

Rotary Wing and Tilt-Rotor aircraft are susceptible to re-circulating dust in arid desert regions reducing visibility during low altitude hover, landing and takeoff. Similar problems can be encountered with dry snow and water operations. A multi-directorate AFRL team was formed on 31 January 2006 to conduct an aggressive 5-month study to develop a complete multi-year technology investment strategy, roadmap, and technology transition plan for Air Force helicopter and VTOL aircraft. The study team has been directed to work with other services, agencies and organizations to develop an integrated product by June 2006. This product will orchestrate the S&T investment strategy for the near-term with the intent of transitioning an integrated solution to the fleet.

The purpose of this RFI is to solicit industry capabilities and interest in addressing potential sensor solutions identified by the AFRL-led "Rotary Wing Brownout Integrated Solution Study." The study has applied system engineering processes to define requirements and to identify technology alternatives. The following core brownout operational tasks have been defined: maintain geospatial awareness of the intended landing point; confirm that the landing zone is suitable for landing (clear of major obstacles/hazards) and refine the intended landing point; confirm that the landing surface has acceptable slope and is clear of surface hazards that might damage the aircraft; maintain awareness of any surrounding obstacles, terrain or other aircraft that pose an immediate hazard during landing and takeoff; and safely and consistently maneuver the aircraft through the transition from cruise flight to hover/landing at the desired location.

Several sensor concepts have emerged from alternative evaluation for detailed assessment. These include eye-safe LADAR, Millimeter Wave (MMW) RADAR, and "Sparse Arrays." LADAR has the potential to collect an ultra-high resolution 4D map (location and intensity) of the landing zone prior to brownout with the potential for a limited capability in brownout. MMW RADAR has the potential to collect a high-resolution 4D map throughout brownout conditions. "Sparse Arrays" is the name given to a concept involving a limited number of RF transmitters and receivers spatially distributed around the fuselage of the aircraft to provide rotor tip to rotor tip coverage (2≠ steradians) to locate proximate obstructions during landing and takeoff. Other sensor concepts are being tracked as potential alternatives, including passive MMW sensing, active and passive acoustic ranging, and stereoscopic imaging.

Severe weight, volume, and cost constraints for rotary wing application provide significant challenges to implementing these sensor concepts. Breakthroughs are needed in eye-safe LADAR system weight with improvements desired in scan rate to reduce the data collection time. For MMW Radar, scaleable flat panel or conformal 94 GHz electronically scanned arrays may provide the needed breakthrough in system weight and performance. Innovative antenna technologies such as appliqués may provide an ultra-lightweight, ultra-low cost solution for "sparse arrays." Other innovative solutions are sought. Insights into potential technologies;

projected weight, volume, and cost benefits; and technology development, cost, and schedule challenges would be very helpful for AFRL investment planning.

Respondents should limit their responses to 10 pages, double spaced, single sided paper. White Papers are due 8 May 2006 and should be submitted directly to the technical point of contact Maj Dan Bush, AFRL/SNZC (937-255-5351x4301), Bldg 620 Rm 1BC39, 2241 Avionics Circle, Wright-Patterson AFB OH 45703. Contractual point of contact is Douglas E. Harris, AFRL/PKV, 937-656-9833.

This is a Request for Information (RFI) only as defined in FAR 15.201 (e) to obtain information about pricing, delivery, and other market information or capabilities for planning purposes. This RFI is not a request for competitive proposals; therefore, responses to this notice are not considered offers and cannot be accepted by the Government to form a binding contact. Companies that respond will not be paid for the information submitted except as an allowable cost under other contracts as provided in FAR 31.205-18, "Bid and Proposal Costs." The Air Force is not required to provide feedback to white paper submittals.