

Near Earth to develop system of aerial scouts to explore unknown indoor environments and communicate their findings to human operators

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PITTSBURGH—The Air Force Research Laboratory (AFRL) has awarded a development contract to Near Earth Autonomy Inc. (Near Earth) to create a system of aerial robotic scouts capable of exploring an unknown indoor or tunnel-like environment. The robots collaborate and communicate the aggregate knowledge to human operators. Exploration may consist of creating a map of the environment or searching for strategic objects in unknown locations within the environment. The system created in the project will directly address the current need of warfighters to survey and clear unknown spaces. Commercial applications of the technology include search and rescue operations in earthquake rubble, avalanches, and collapsed mines. The project, named “Cooperative Autonomous Tunnel Mapping,” will be led by Near Earth’s CEO and Chief Scientist, Dr. Sanjiv Singh, and Senior Systems Engineer, Brad Hamner.

The work funded by AFRL will address three key challenges: first, discovering unknown tunnel network topology incrementally by flying robots; second, generating globally consistent maps, given state estimates and environmental representations sensed by flying robots are imprecise; and third, optimizing coordination and map generation to run in real time given computing and communication resources on flying robots are limited. Demonstrations with up to four cooperating aerial scouts in representative environments will prove the validity of the proposed system and concepts.

Near Earth (<http://nearearth.aero>) is a privately held, spin-off from Carnegie Mellon University. The company develops comprehensive solutions for manufacturers and users of low-flying aircraft that need to operate in all weather conditions, and in hostile unprepared environments. Near Earth bridges the gap between aerospace and robotics with complete systems that improve safety, efficiency, and performance and expands the types of missions where aircraft are used, enabling manned and unmanned operations. Currently, the company leads key efforts in perception, motion planning, and human-machine interfaces as applied to cutting edge programs developing next generation capabilities for aviation.