

Defense Sciences Office

Chemical Robots (ChemBots)

If covert access to denied or hostile space is required during military operations, the effectiveness of unmanned platforms such as mechanical robots can be limited if the only available points of entry are small openings. The goal of the Chemical Robots (ChemBots) program is to create a new class of soft, flexible, meso-scale mobile objects that can identify and maneuver through openings smaller than their dimensions and perform tasks once entry is gained. The program seeks to develop a ChemBot that can perform several operations in sequence. It should travel a specified distance and traverse an arbitrarily shaped opening much smaller than the largest characteristic of the robot itself. Once through the opening, it will reconstitute its size, shape, and functionality and travel again to perform a task using an embedded payload. ChemBots merges materials chemistry and robotics through application of any one of several approaches including gel-solid transitions, electro-and magneto-rheological materials, geometric transitions, and reversible chemical and particle association and dissociation. If successful, ChemBots will help warfighters gain access to denied spaces and effectively perform covert tasks.

Program Manager

Dr. Gill Pratt
gill.pratt@darpa.mil