Topic: N141-042

Intelligent Automation, Inc.

GECKO: Agile and Dexterous Robot for Maintenance of Ship Tanks

Ship tank maintenance and damage control surveys are expensive and labor-intensive endeavors that regularly expose maintenance crews to significant environmental and safety hazards. Intelligent Automation Inc. (IAI) is developing GECKO, an agile and dexterous robot designed to meet all requirements for remote Level 1 inspection of ship's tanks and voids that will reduce task execution time and manpower. For mobility, GECKO combines vacuum crawler technology with IAI's legged robot locomotion technology to traverse unstructured ship tank environments. For manipulation, GECKO leverages IAI's state-of-the-art Multi-Arm Robot Control System (MARCS) technology to enable an operator to perform dexterous inspection and maintenance tasks. GECKO has been prototyped, and is currently being matured, with the goal of transitioning to the Navy fleet. We are also looking for commercial partners.

Technology Category Alignment:

Ground and Sea Platforms
Maintainability/Sustainability

Contact:
Brent Spranklin
bspranklin@i-a-i.com
(301) 294-5265
http://www.i-a-i.com
SYSCOM: NAVSEA
Contract: N00024-16-C-4047

Corporate Brochure: https://navystp.com/vtm/open_file?type=brochure&id=N00024-16-C-4047

Department of the Navy SBIR/STTR Transition Program

DISTRIBUTION STATEMENT A. Approved for public release. Distribution is unlimited.
NAVSEA #17-565

Topic # N141-042

GECKO: Agile and Dexterous Robot for Maintenance of Ship Tanks

Intelligent Automation, Inc.

WHO

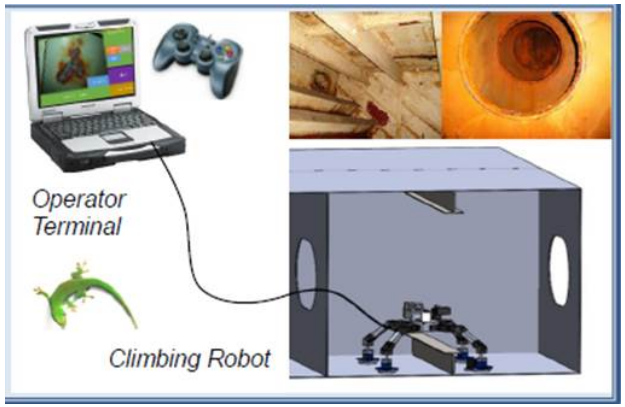
SYSCOM: NAVSEA

Sponsoring Program: SEA05T1R

Transition Target: Cross Platform Systems Development (CPSD)

TPOC:
(301)227-4121

Other transition opportunities:
PEO Ships
PEO LCS
PEO Subs
PEO Carriers



Notes:
As a crawler designed for remote inspection that walks directly on the surface, GECKO may be of interest to any potential users that require inspection of regions where it is difficult/dangerous to send humans.

WHAT

Operational Need and Improvement:
A remotely-operated, semi-autonomous robotic tool for inspection of potentially hazardous confined space ship environments. Such a tool would allow inspection and exploitation of confined spaces without the the need to gas-free the space.

Specifications Required: Robot that has:
- Ability to position and operate camera and tools required for Level 1 inspection.
- Spatial navigation, can grip, and has stabilizing features.
- Operate on different metals; steel and aluminum.
- Navigate structural members - frames, bulkheads, piping, cabling and ladders.

Technology Developed:
A legged, walking platform that climbs over and through obstacles
- Adhesion feet (vacuum & magnetic) allow the GECKO to climb up walls.
- Camera system for inspection, dexterous camera manipulation to access difficult-to-see locations.
- Semi-autonomous behaviors allow user to drive GECKO with minimal workload.
- Software allows for real-time assessment and documentation of ship damage and corrosion.

Warfighter Value:
- Allows inspection of ship structures without exposing sailors to hazardous environment.
- Real-time assessment and data collection expedites evaluation lowering cost.
- Reduced workload by automating an streamlining the reporting process for inspection.

WHEN

Contract Number: N00024-16-C-4047 **Ending on:** May 3, 2018

Milestone	Risk Level	Measure of Success	Ending TRL	Date
GECKO Performs Simple Maneuvers, Lab Environment	N/A	Walks on Lab Surface, Demonstrated	4	June 2017
GECKO Performs Complex Maneuvers, Lab Environment	Med	Climbs through Bulkhead, Demonstrated	4	January 2018
GECKO Performs Mock Inspection in Representative Tank (Dry)	Med	Demonstrates Inspection Tasks	5	April 2018
GECKO Performs Mock Inspection in Representative Tank (Wet/Dry)	Med	Demonstrates Inspection Tasks	5	December 2018

HOW

Projected Business Model:
- IAI's plans to pursue GECKO as an IAI-branded product. IAI will lead product management, development, training, and support.
- IAI will work with an established manufacturer to lead manufacturing of the hardware platform.
- IAI will also investigate partnering with established service providers to support GECKO sales, marketing, distribution, and on-site customer support.

Company Objectives:
IAI intends to commercialize GECKO technology, as well as expand our portfolio in the robotic manipulation/locomotion, remote inspection, and non-destructive evaluation (NDE) arena.

Potential Commercial Applications:
- Classification Society
- Inspection and Maintenance of:
  - Commercial ships
  - Oil & gas rigs
  - Nuclear power plants
  - Bridges

Contact: Brent Spranklin, Sr. Mechanical Engineer
bspranklin@i-a-i.com (301)294-5265