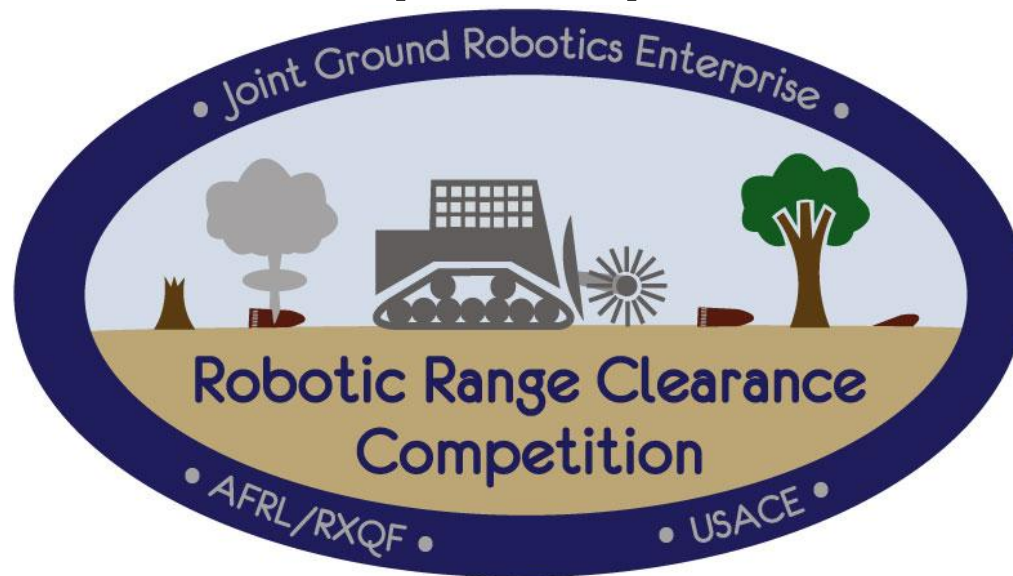


# Robotics Range Clearance Competition (R2C2)



**Mr. Rob Maline**  
Director, Joint Ground Robotics Enterprise  
[robert.maline@osd.mil](mailto:robert.maline@osd.mil)

# Problem Statement

- Standard unexploded ordnance (UXO) clearance methods are:
  - Costly
  - Time consuming
  - Imperfect
  - Dangerous
  - Difficult to price
- New ranges are constructed on impact areas
- Existing ranges require:
  - Target maintenance
  - Line of sight maintenance
  - Periodic surface clearance



# UXO Clearance Market

- Total US Market on order of \$400M/yr
- Approx. 20% can be performed by robotics
- Army Range Clearance: \$12M-\$25M/yr
- Of that \$3M-\$5M could be eliminated by automated vegetation removal
- Another \$3M-\$5M could be eliminated by automated surface and sub-surface clearance



# Robotic Range Clearance Competition Goal

- Advance the state of the art in robotics range clearance technologies to safely and efficiently clear ranges of debris and unexploded ordnance



- The R2C2 supported the ultimate aim of clearing millions of acres currently encumbered with spent training rounds and munitions' debris and placing the land back into productive use

# Competition Concept

- The competition was an assessment of the competitors' system performance against a specified set of metrics that satisfy the operational requirements for range clearance
- The systems were not compared against each other. Thus the winner(s) were determined by achieving the best performance to the metrics for the designated tasks



# The Competitor Teams

## Team D4C

- ECC, QinetiQ North America, Bobcat



## Team Sky Research



## Team UXOD

- Kairos Autonomi, Autonomous Solutions, SAIC, WM Robots, Zonge, Vallon, VKR, John Deere



# R2C2 Results

## Competition Results:

- Unmanned Vegetation Clearance (\$250K)-**Team D4C**
- Unmanned Geophysical Mapping (\$250K)-**Team UXOD**
- Unmanned Surface Debris Clearance (\$250K)-**Team D4C**
- *Unmanned Sub-surface UXO Clearance (\$250K)-**Not Awarded***

**Best Overall Score (\$1M)-Team UXOD**