# Robotics Training and Competition Validation

## AT A GLANCE

### WHAT IS IT?
A design-based research program co-evolving theory and effective training for Robotics Warfare Specialists (RW), who will be expected to thrive as optainers of critical Naval robotics platforms amidst rapid technological change.

### HOW DOES IT WORK?
Existing robotics technician training materials are adapted and used as a vehicle to test design principles for RW training. Data collected in each iteration drives revision of instructional theory and domain-specific curriculum design principles; as well as produce repurposable experimental curricula embodying the design hypotheses of the latest cycle.

### WHAT WILL IT ACCOMPLISH?
The project seeks to address:
- Whether and how hands-on training on many different small robots promotes *rapid practical comprehension across platforms*
- Whether and how programming and AI instruction improve RW performance, even though RW neither writes code nor trains AI
- Novel emergent phenomena discovered through testing

Experimental materials may also:
- Accelerate the stand-up of RW "A" School (from OCT 2026)
- Shorten RW training time (experimental length: 6 weeks)

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In February 2024, the Navy announced the establishment of its first new rating in years: RW, the Robotics Warfare Specialist, to maintain and operate the wide array of robotic systems in the Navy today, and the even larger number is expects in the near future. In September, NAVPLAN 2024 and Project 33 re-emphasized the urgent need to simultaneously operationalize robotic and autonomous systems and invest in warfighter competency – training and training methods.

This project uses a design-based research methodology to embrace the dual nature of research and development through iterative co-evolution of theory and curriculum. We jump-started the cycle with an existing robotics technician training curriculum, adapted it for RW in Winter 2023, and piloted it in Summer of 2024. First cohort participants reported value from hands-on engagement with multiple robots, and in understanding all components of the system rather than siloed subsystems. Inclusion of Programming and AI topics had been hotly debated– RW does not write code, nor does it train AI models -- but participants found both valuable.

These findings have been synthesized into second iteration design hypotheses:
- That the use of multiple, increasingly advanced robot platforms will produce a productive spiral of motivation, knowledge, and reasoning about novel platforms
- That "adjacent" domain training will improve performance on core RW tasks by enabling *technical situational awareness* that facilitates troubleshooting decisions

### Research Challenges and Opportunities:
- Measures of empirical performance on RW tasks do not exist yet; we are simultaneously developing a Robotics Competition to serve this function
- Design requirements evolve at the speed of robotics technology and Naval needs, testing the limits of our rapid iteration-based methodology
- Research findings can inform the development of RW and other "A" Schools
- Curricular products could establish the basis for very short but effective training