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Manned-Unmanned Teaming in Distributed Maritime Operations

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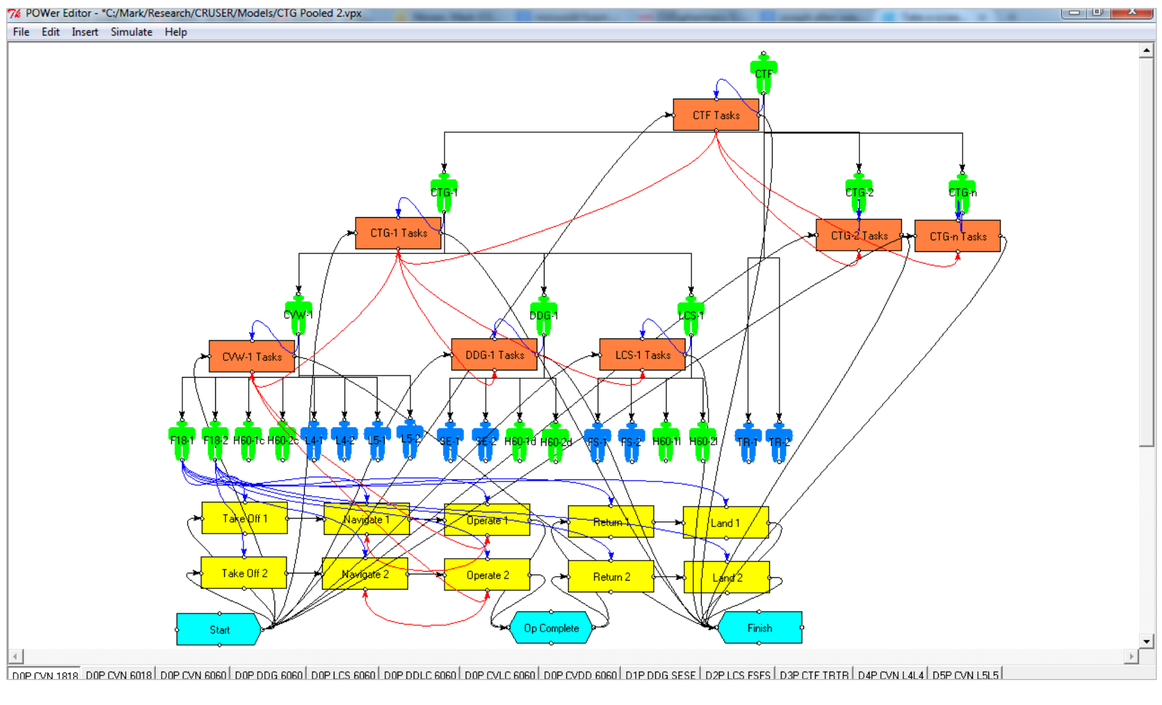
Background

- Autonomous systems (AS) very sophisticated
- Manned-unmanned teaming is important
- Particularly for distributed maritime ops (DMO)
- Distributed combatant-sensor integration is key
- Considerable command & control (C2) challenge

Manned-Unmanned Teaming



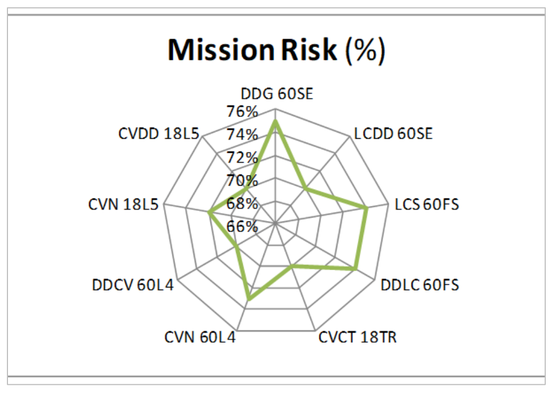
JTF ISR Model

DMO Modeling & Simulation

- Leverage state of the art (Stanford-NPS)
- Establish DMO modeling & simulation capability
- Focus first on JTF ISR missions as baseline
- CVN, DDG & LCS; F/A-18 & MH-60
- ScanEagle, FireScout, Triton & future capabilities
- 24 models x 8 metrics x 50 simulations

Key Findings and Results

- State of the art Navy organization simulation system
- Analyze 24 manned-unmanned ISR mission combinations
- 6 degrees of autonomy x 4 levels of interdependence
- Assess mission duration, coordination, risk & other performance metrics
- Huge and rich dataset for analysis
- Autonomy, interdependence & C2 exert major performance effects
- Powerful baseline for comparison with alternate DMO approaches



One Result – Mission Risk

Recommendations for Future Research

- Extend model to include other platforms (CG)
- Extend model to include other missions (AW)
- Extend model to include other C2 (Edge)
- Use model to assess alternate DMO approaches
- ID key mission performance tradeoffs
- Use to inform Fleet design & decision making

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