

## EXECUTIVE SUMMARY

### Undersea Constellation

**Introduction:** A four-student Naval Postgraduate School (NPS) wargaming team designed, developed, and conducted a closed wargame to examine how utilizing elements of the Undersea Constellation (UC) impact the kill chain, Blue losses, and C2 in an anti-access area denial (A2AD) environment. The wargame was played 1-3 December 2014 at the MITRE Corporation facilities in San Diego, CA. A number of UC and submarine subject matter experts were present for the wargame. [Talk about the Red and Blue players and their qualifications.] A seminar style wargaming session was conducted on the first day. This served two purposes. First, it allowed all players to familiarize themselves with the game and the elements of the UC. Second, since the NPS students were not UC experts, it allowed the students to present the game to the experts and get the buy-in for the rules and the game itself. Any issues that were identified were discussed and rectified prior to the start of the wargame. Turn-based gameplay commenced on 2 December. The outbriefing and an exit survey were conducted on 3 December. The executive summary and final analysis briefing were provided to the sponsor via e-mail on 18 December.

**Game Design and Methodology:** The game was designed using the Philippine island of Palawan as the contested territory. In order to provide the sponsors with the requested metrics, an innovative gameplay technique was used. The team divided the gameboard into two similar fronts. One front was treated as the control game and had no UC assets available for use. The second front had all of the assets of the first front with the addition of the UC assets. Both teams had established objectives that they were trying to obtain in order to win the game. Each side was unaware of the other side's objectives. Additionally, the Red team did not know which front the UC was utilized on. Players were then required to make the moves for each of their respective fronts simultaneously. This was done to mitigate the learning effects that two games played in series would have had. Both qualitative and quantitative data was collected during gameplay.

**Observations:** Analysis of Red data showed that the elements of the UC that were utilized during the game did have a favorable impact on Blue's operations. On one particular turn, on the UC front, Blue forces were able to utilize UC nodes to conduct 3rd party targeting of two Red surface ships. In this particular case, the Red vessels were identified, attacked and destroyed in one turn. Unlike in previous engagements in the control game, the Red force had no opportunity to counterattack, and at the conclusion of the engagement, still had no idea how they were attacked and lost two ships. At the conclusion of gameplay the Red forces had lost one surface ship and one submarine in the control front, and two surface ships in the UC front. Blue lost zero submarines in the UC front compared to two submarines in the control front. This was significant since it was a Blue objective to not lose a submarine. Blue did lose UUVs in the UC front, but that was anticipated as accepting greater risk to unmanned vehicles was part of Blue's UC strategy, where UUVs were used for scouting and third party targeting. Additionally, the gameplay in the control front consisted of a significant amount of attacking and counter-attacking during engagements. In the UC front, the engagements consisted of Blue making attacks via 3rd party targeting. Red was not able to ascertain the origin of the attack and therefore not able to counter-attack.

**Conclusion and Recommendations:** Results from the wargame indicate that the UC is a force multiplier for the Blue forces. The addition of the UC proved to be a significant technological advantage for the Blue forces. Additional analysis of the UC capabilities and the integration of UC assets with the current

force is recommended. Additionally, the game was designed to allow the introduction of new or different UC technology. It is recommended that the game continues to get played by different players and with different mix of UC technology.