

Doodle Labs Designs 1.4 GHz Broadband Radio for Military Ground Robot



Harris partnered with Doodle Labs to design and deploy a broadband data link to operate its T7 Multi-Mission Robotic System through noisy conditions

Harris joined a team led by Northrop Grumman to develop an explosive ordnance disposal (EOD) robot for the US Navy, as part of a program called Advanced Explosive Ordnance Disposal Robotic System (AEODRS). In order to maintain connectivity in the most challenging situations, Harris approached Doodle Labs to develop a MIMO radio customized specifically for the T7.

Business Challenge

Based on the inputs of hundreds of users, Harris developed the T7 robot from the ground up to support the demanding requirements of commercial and military missions, including hazardous materials (HAZMAT) cleanup, explosive ordnance disposal, intelligence, surveillance and reconnaissance (ISR), and special weapons and tactics (SWAT) missions.

Given the challenging situations in which the T7 was to be deployed, Harris needed a high-performance communications link. Of most interest was having the ability to maintain connectivity in complete non-line of sight (NLOS) situations, such as through a building and wreckage so that the systems could be operated from 100 meters away. While in this situation, high-throughput data was required so that video could be sent. Fresnel zone interference was also an issue for long-distance communication since the system is only a few feet high. All of this needed to be solved in rugged, vibration-proof construction that operated in extended temperature ranges.



Solution

Harris approached Doodle Labs with the challenge of customizing a radio solution for the T7. Since the end-customer was the military, the team had flexibility in choosing the operating frequency. In partnership with Doodle Labs, a host of experiments were run and it was determined that 1.4 GHz performed best at maintaining connectivity in NLOS situations as radio waves were able to reflect off of buildings to the sides of the obstruction.

With the 1.4 GHz frequency requirement, the Doodle Labs team designed and constructed a high-power communications system leveraging building blocks from its [Industrial Wi-Fi Transceiver](#) family and its [Front-End Subsystem \(FES\)](#) family. The FES took a 2.4 GHz signal from the transceiver and down-shifted it to operate at 1.4 GHz. In addition, the FES also acted as a power booster to ensure connection was never lost.

Results



The completed solution from Doodle Labs was successfully integrated into the T7. In field tests, the system was able to double Harris' 100 meter NLOS requirement and achieve operation from 200 meters away through a building.

The T7 has now been deployed to government customers around the world, and in the US the AEODRS program has passed the Critical Design Review with the US Navy.

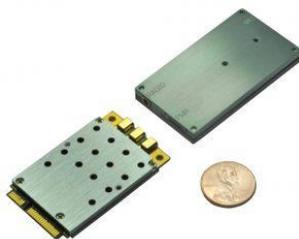
Doodle Labs now has a product line called [Prism Wi-Fi Transceivers](#) that combine Industrial Wi-Fi Transceivers and Front-End Subsystems.

Customers can now buy commercial off-the-shelf versions of the solution.

Video of the T7: <https://youtu.be/5zX2LwiT0xA>

Related Products

[Prism Wi-Fi Transceivers](#)



[Industrial Wi-Fi Transceivers](#)



[Front-End Subsystems](#)

