



Radio Control & Unmanned Systems Overview

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The modern battlefield is full of robots all talking at once. Unmanned systems consume significant amounts of communications bandwidth because they require transmission of control signals and large amounts of sensor data. Line-of-sight (LOS) limitations often obstruct high frequency digital radio communications. In addition, encryption, which is necessary for security, can decrease operational distance.

Besides compromising range, radio noise may also affect how the robots respond to instructions, even instigating false commands. Another consideration is the additional power consumption necessary to burst through interference.

Different types of unmanned systems have specific radio communication challenges. UUVs controllers have to compensate for water-induced radio interference. UAVs need to communicate with air traffic control systems and have lengthy mission distances which require changes in ground control stations, and/or the use of satellite links. UGVs operational distance may be affected by landscape features, such as hills, hardened concrete walls (a major urban consideration) and “friendly” jamming (an estimated 10,000 jammers are used in Iraq to disable enemy roadside bombs).

In 2007, Department of Homeland Security discovered that radio interference seriously compromised the effectiveness on 70% of the robots tested. In fact, this was regarded as such a problem, that using technology reminiscent of the Goliath, a World War II era German mobile landmine, Laurence Livermore National Laboratories developed a cable-operated bomb disposal robot.

While unmanned systems that operate in caves or underwater may use cable control, most will continue to rely on radio. Robot developers and designers will have to contend with the challenge of exercising control in a very noisy battlefield.

AMREL has attacked the problem of radio interference with an innovative modular design. This solution has been successfully deployed in many theaters (see [Modular Kit Solution](#)).

To learn more about AMREL’s modular radio control solutions, **contact Mike Castillo, our Senior Applications Architect for Robotics:**

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