

Dr. Ken Gilleo

Could Technology Win World War III?

Tomorrow's battlefields could resemble TV shows like *Battlebots*.

Some political analysts are telling us that we are in the midst of World War III, the war on terror. True, America has been under siege for decades, but the events of Sept. 11, 2001, removed all doubt. Homeland defense and military actions on the other side of the world are the critical issues of this decade. Many say that the Cold War was won through our nuclear missile advancements, which were certainly a central component. But what technology will keep us out of harm's way in the future and make the world safer? Just about every technology, new and old, is being brought to bear against the threats of terrorists near and far: optics, photonics, high-energy beams, acoustics, biometrics, software, advanced communications and sensor-detector-analyzers for poisons, explosives, pathogens and radioactive materials. Let's look briefly at some of them.

On the home front, more airports are employing biometrics, especially non-contact methods like facial recognition. While face recognition tools have received bad publicity because of concerns over privacy issues, the technology continues to improve and dozens of companies are working on solutions. The answer lies more in data analysis than camera resolution, and eventually the software specialists will succeed. Threat detection technology, more important than ever, is expanding and improving. MEMS (microelectromechanical systems), new types of sensors and related systems are being used to boost sensitivity and discrimination of detectors. Advanced spectroscopy is being put to practical use as systems are miniaturized and automated to quickly identify CB (chemical-biological) weapon threats. But plenty of lower technology is still in use, like metal detectors, x-ray and swabs that change color when in contact with oxidants from explosives.

In the war zones, improved UAV (unmanned aerial vehicles) are being deployed. The now-classic Predator Air Force uses MEMS, GPS, satellite linking, photonics and sophisticated software to fly missions. At least a dozen other UAV programs exist, some with much smaller and less costly systems. Live video can be streamed to ground stations and manned aircraft. The

squadron of UAVs is being networked for synergy. Ground unmanned vehicles (GUV) and even ships are destined for automation; future wars may be won by the best robots. (The BattleBot competition is starting to make sense!) Packbots with both sensors and armaments are being tested. And the laser, weapon of choice for sci-fi, is finally scoring some impressive hits. There has been mixed success in the missile defense program in terms of laser knockdowns, but recently a smaller, more mobile laser has destroyed artillery shells in flight. Perhaps the day will come when the only fatality is hardware.

Smart weapons are getting smarter and their sight is improving. Missile upgrades now involve changing the guidance system and leaving the propulsion and armament alone. And the incredible miniaturization delivered by MEMS is bringing guidance to smaller and smaller ordnance all the way down to bullets.

One new technique is a "pain ray," or ADS (Activity Denial System) that disables opponents by sending out a microwave-like beam. Mounted on a Humvee, the non-lethal weapon sends the opposition running, or smoking; it's their choice. Powerful sound-wave beams are also in test; a focused "sound" wave can act at a distance and stun a combatant.

Communications has played an important role in battles for thousands of years and was a key to victory in WWII. Signal detection, decoding, analysis and interpretation are even more vital today, and exceedingly advanced. We hear about "chatter" as if it was an increase in noise on a radio band, but analysis is sophisticated and much is automated. Osama Bin Laden cannot use a cell-phone without being targeted in seconds. (Too bad the media found out how it worked and alerted him.)

Ironically, our persistent advancement in technology may have an unfortunate and unavoidable effect. Those who would challenge the technical superiority of the U.S. know they cannot win since even the mighty U.S.S.R. was defeated. Thus, the enemy appears to be moving from conventional weapons and high-tech battle to lower-cost, but much more intimidating, nuclear armament. ■

Dr. Ken Gilleo is
with ET-Trends LLC;
email: et-trends@
cox.net

