

## **The Real “Warbots”?**

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Surf the web for warbots and you will find some clever little robots that are designed to “kill” each other. You can also find them battling on TV programs. Their teams observe the machines directly and control them remotely with standard radio technology. But what about the real warbots, the military unmanned vehicles that are designed to fight a real war? Are they here already? Yes, well, sort of! More important, will the warbots become the primary warriors of tomorrow? Maybe! Let’s look at what’s been happening in the high tech military sector of Unmanned Vehicles.

Most of you are probably familiar with the UAVs (Unmanned Aerial Vehicles) like the Predator and Global Hawk that are being used in the Afghanistan battles. But they are not new. During April and May of 1995, the Predator was run through a proof of concept demonstration at an annual exercise held at Roving Sands in the USA. The Predator was deemed a success during tests and production moved ahead. But work in the unmanned field has been going on for nearly 4 decades.

Since 1964 the Defense Department has developed at least 11 different UAVs although only 3 entered production according to the DoD website. The most well known is the Predator, a Medium Altitude Endurance UAV that provides imagery intelligence for ranges out to 500 nautical miles. Next, the Global Hawk is a High Altitude Endurance UAV intended for missions requiring long-range deployment and wide-area surveillance or long sensor dwell over the target area. The Hawk can fly around the world using GPS, satellite and ground communications. Some of these UAVs can fly over a ship or near a manned aircraft to send a high-bandwidth burst of photonic data including surveillance imagery. No radio waves to intercept or even detect. These aircraft are programmed to carry out missions, and like our explorer spacecraft, are not constantly under direct control.

The new US military budget could spend a billion bucks in 2002 for new and improved UAVs. These flying warriors can “see”, “hear”, identify and shoot. Perhaps standard fighters, like the F-16, will be retrofit to fly robotically. But right now, most of the funding is going into UAVs for surveillance and reconnaissance. And thinking “small” is also trendy. The Micro Unmanned Aerial Vehicles (MAV), a DARPA program, will explore the military relevance of Micro Air Vehicles for future military operations. The funding is expected to develop and demonstrate flight-enabling technologies for very small aircraft of less than 6 inches in any dimension. We can bet that MEMS technology will be used for really small fliers that look more like robotic insects. Expect to hear about (too small to see?) nanobots that can fly into caves, buildings or just about anywhere.

But large UAVs will get the main funding. We may hear about Darkstar, Dragon, Firebee, Gnat, Eagle Eye, Outrider, Hunter and Sea Ferret in the future. Some are large and others are small, but most will use state-of-the-art technology from electronics, photonics and MEMS; detectors, engines, controllers navigation and all kinds of sensors.

What about unmanned watercraft beyond the torpedo? They are already here and could mature rapidly. The Navy Undersea Warfare Center (NUWC) in Newport, RI, is developing defensive robotic vessels, but prototypes already exist. Navtec (International Robotic Systems) began working on unmanned surface craft in the 1980's under government contract. Their "Owl" is awake and prowling – mostly for more funding. Raytheon expects to launch the Spartan surface unmanned watercraft. The Navy has indicated that the future will see a wide variety of remotely controlled and autonomously operated vehicles. Just wind them up, select the program and hit the "go" button. The launch pad can be anywhere; land surface ships, submarines and even aircraft. Their first duty will likely be to protect our ships from suicide attackers so and others who bring harm so that a tragedy like the USS Cole disaster will not happen again.

The robot tanks are coming, too. While some strategists say that the tank has become obsolete, robotic technology may thrust the unmanned ground vehicle into the heat of battle. Unmanned ground vehicles may already be under test in Bosnia. And maybe we will retrofit and robotize older ground vehicles. The retrofit strategy has been very successful for gravity (dumb) bombs that have been upgraded with kits that transform them into precise smart weapons dropped from high-altitude bombers.

What about satellites? These unmanned vehicles have been robotized for decades and have traveled the solar system. They already look, analyze and report back, a relatively straightforward task. Arming them with energy weapons is an obvious next step that may have already been done. Nothing can outrun a light beam and little can stop a beam with wavelengths in the x-ray spectrum.

Does the military with the best technology win? Or could the "bots" turn against us as depicted in dozens of science fiction stories? Could they even be hacked? Every technology has its strong points and vulnerabilities. In the final analysis, it is human intelligence that ends the game so well told in "Ender's Game" (Francis Scott Card).