



Don't believe the bunny: Power & Unmanned Systems

by William Finn, AMREL Senior Copywriter & Editor

March 2, 2010

Despite the ad with the drumming bunny, batteries in unmanned systems do not last forever. In fact the performing rabbit robot's power lasts only three to four minutes.

Battlefield robots do better (a typical UGV batteries may last about 2 hours), but power is a huge challenge. This seems counter-intuitive, since one of the main advantages of unmanned systems is that, by definition, they don't have to lug around people. However, mobility is only one source of power consumption. Communications and cooling systems may actually be more of a drain than simple transport.

While optical sensors and computers have become more advanced and efficient, batteries are one of technologies great underachievers (the Energy department is reportedly spending billions on battery research). Furthermore, the military wants additional power for more demanding applications, greater operating range and longer mission times.

One solution is to add more batteries. More batteries means more weight, which wears out the batteries further, which means you need more batteries, which,.. well, you get the idea.

Power problems grow as the robots get smaller, and they *will* get smaller. Some analysts say that Micro Air Vehicles (MAV) are the wave of the future, because Integrated Air Defenses (IAD) have made expensive large-fame vehicles like the Predator vulnerable. Cheaper, lower profile MAVs are more expendable and therefore more practical.

Not all unmanned systems are powered by batteries. Some have internal combustion engines similar to their manned counterparts. Gas-powered engines are problematic. Noise and thermal signatures expose the robot to attack. Also, petroleum fuel is expensive to deliver to a war zone. Once the costs of logistics are added in, a gallon can run \$300 or higher.

Mindful of the difficulties posed by batteries and gas power, unmanned system designers are experimenting with alternative methods. Powered by a hydrogen fuel cell, the Ion Tiger UAV made headlines when it flew for a record-breaking 23 hours and 17 minutes. While a far cry from Defense Advanced Research Projects Agency's (DARPA) goal of creating an endurance capability of 5 years, it did demonstrate the promise of newer technologies.