MILITARY APPLICATIONS OF ELECTRONIC TECHNOLOGIES

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1. **Cluster munitions** or **cluster bombs** are air-dropped or ground-launched munitions that eject smaller submunitions: a cluster of bomblets. The most common types are intended to kill enemy personnel and destroy vehicles.

A basic cluster bomb consists of a hollow shell and the two to more than 2,000 submunitions contained within it. The submunitions themselves may be fitted with small parachutes or streamers to slow their descent.

A growing trend in the design of submunition-based weapons is the smart submunition, which includes the CBU-97 sensor-fused weapon. Munitions specifically intended for anti-tank use may be set to self-destruct if they reach the ground without locating a target, theoretically reducing the risk of unintended civilian deaths and injuries. Each submunition contains four hockey-puck-shaped sensor-fused projectiles called Skeets. The 40 Skeets scan an area of 1,500 feet (460 m) by 500 feet (460 m × 150 m) using infrared and laser sensors until it finds a target, or failing that, self-destructs 50 feet (15 m) above the ground. The laser sensor detects changes in height such as the distinctive contour of a vehicle. At the same time, infrared sensors detect heat signatures, such as those emitted by the engine of a target vehicle. When the combination of height contours and heat signatures indicative of a target are detected, the Skeet detonates.

The CBU-97 was first deployed during Operation Allied Force when the United States and NATO entered the Kosovo War, but were not used. Sensor-fused weapons were first fired in combat during the 2003 invasion of Iraq.

The Convention on Cluster Munitions, CCM, was adopted in Dublin by 107 states on 30 May 2008. The Convention prohibits all use, stockpiling, production and transfer of Cluster Munitions.

2. **Anti-satellite weapons** (ASATs) are space weapons designed to incapacitate or destroy satellites for strategic military purposes. The development and design of anti-satellite weapons has followed a number of paths.

The initial efforts by the USA and the USSR were using ground-launched missiles from the 1950s; many more exotic proposals came afterwards.

The ASAT potential of high-energy lasers has been extensively explored by the US and to a lesser degree by the USSR.

As many as 30 states may already have the capability to use low-power lasers to degrade unhardened sensors on satellites.

So what do you do if someone fires a powerful laser at your satellite? The optics on the satellite will probably be fried, so you couldn't see who did it. In 1997, the US Mid-Infrared Advanced Chemical Laser (MIRACL) was test-fired against a satellite in a 420-kilometer orbit, damaging the satellite's sensors.

The MIRACL laser first became operational in 1980. It can produce over a megawatt of output for up to 70 seconds, making it the most powerful continuous wave (CW) laser in the US.

Electronic signal manipulation is another major class of ASAT weapons effort. The signal to the satellite can be changed with incorrect information replacing the correct information. This is called *"spoofing."*

On January 11, 2007, China destroyed an old orbiting weather satellite. The United States also destroyed a malfunctioning reconnaissance satellite on February 21, 2008.

3. **The TALON** is a man-portable robot operating on small treads. It weighs less than 45 kg. TALON is operated with a joystick control, has seven speed settings (top speed is 6 feet/1.8 meters per second) and can use its treads to climb stairs, maneuver through rubble and even take on snow. It transmits in color, black and white, infrared, and/or night vision to its operator, who may be up to 1,000 m away.

The robot is controlled through a two-way radio or fiber optic line from a portable or wearable Operator Control Unit (OCU) that provides continuous data and video feedback for precise vehicle positioning. SWORDS or the Special Weapons Observation Reconnaissance Detection System, is a weaponized version being developed by Foster-Miller for the US Army for small arms combat and guard roles.

There is a variety of different weapons that can be placed on the SWORDS: M16 rifle, 5.56 mm SAW M249, 7.62 mm M240 machine gun, .50 cal M82 Barrett rifle. In 2007, three SWORDS units were deployed to Iraq. Each unit is armed with a M249 machine gun.