



## TECHNOLOGY

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19 July 2010 Last updated at 07:38 ET

# Anti-aircraft laser unveiled at Farnborough Airshow

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**By Daniel Emery**  
BBC Technology reporter

**US firm Raytheon has unveiled its anti-aircraft laser at the Farnborough Airshow in Hampshire.**

The Laser Close-In Weapon System (CIWS) can either be used on its own or alongside a gunnery system.

In May, the laser was used to shoot down unmanned aerial vehicles (UAVs) in a series of tests.

Raytheon said the solid state fibre laser produces a 50 kilowatt beam and can be used against UAV, mortar, rockets and small surface ships.

The idea of using lasers as weapons has been around almost as long as the laser itself, invented in 1960.

Initially, the systems were chemical lasers, which get their power from a chemical reaction. They are very large pieces of equipment and are very fuel hungry, requiring a

significant quantity of chemicals to drive them. The fuel is frequently toxic, requiring operators to don protective clothing.

Solid state lasers, in contrast, consist of a glass or ceramic material to generate a laser beam.

They are smaller, more compact and only require an energy input to generate the beam, although the energy required is still significant.

However, until recently, solid state lasers were not able to reach the same power levels as chemical lasers and so were not deemed suitable for military use.

### **'Last defence'**

Peter Felstead, editor of Jane's Defence Weekly, told BBC News that CIWS was the start of real world applications for military solid state lasers.

"OK, so a UAV isn't armoured, nor is it flying fast, but as you can see from the video they shot it down in flames," he said.

"That's the very beginnings of what we can expect to see as firms miniaturise their technology and make them more effective."

Speaking to BBC News, Raytheon Missile Systems' vice president, Mike Booen, said that the tests, performed in a maritime environment, were a big step forward for laser technology.

"We've tied this into Phalanx, the US Navy's anti-missile defence system that links a multiple barrelled 20mm Gatling gun to a radar guidance mechanism.

"This system is already installed in many ships, both in the US and other Nato nations, such as the Royal Navy.

"It functions as the last line of defence, so if you can fit a laser onto it, you have a longer reach and an unlimited magazine, cause it keeps on throwing out photons," he added.

Two problems that have dogged laser weapon development for some time are weather conditions and the target itself. Damp maritime air can absorb the laser energy before

it reaches the target and - as developers discovered in the 1960s when trying to target Russian Mig aircraft - a reflective surface can negate much of the laser's effectiveness.

Mr Booen acknowledges this, but said that these problems could be overcome.

"Every material reflects, but you can overcome this with power; once you get over a certain threshold - measured in multiple kilowatts - then the laser does what it is designed to do," he said.

Mr Booen said that once a material started getting hot, it affected the reflective ability, making the target absorb more energy and eventually leading to its destruction.

### **Land use**

In May, the firm knocked out a number of UAVs at the US Navy test range on San Nicolas Island off the coast of California.

Although Raytheon would not give details of the height, speed and range of the UAVs, saying that data "sensitive", it did say that the Navy wanted tests to be as realistic as possible, suggesting that the aircraft were behaving in the way military planners would expect them to.

"This is the first time a UAV threat has been targeted and neutralised in a marine environment," said Mr Booen

"On a ship, the laser can be mounted inside a ship and the beam fed up through fibre cables.

"It was a bad day for UAVs and a good one for laser technology," he added.

The firm is also working on a sister land based system that can be used to target mortar and rocket rounds.

"On land, it could be mounted in trailers so it has applications across the globe," said Mr Booen.

Mr Felstead agreed, saying it could have "great capability" as a last line of defence in many situations.

"There are numerous real world applications for a laser than can knock out airborne threats, especially mortars and rockets.

"Airbases in Afghanistan, the Green Zone in Baghdad or the border with Gaza and Israel could all potentially use something like this.

"We're still some way off being able to take out an [Intercontinental Ballistic Missile] missile with laser technology, but we're on the path to that," he added.

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