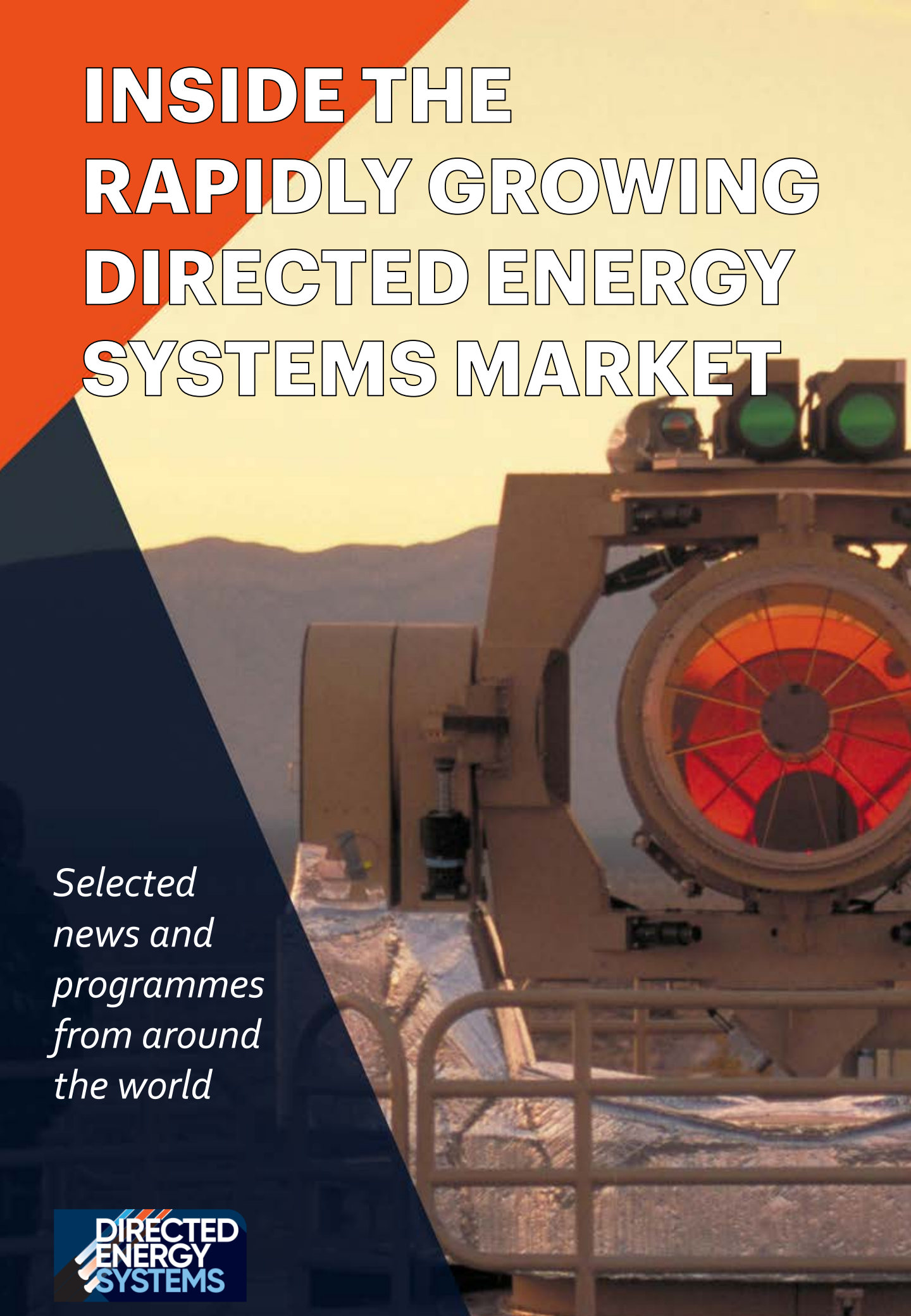
INSIDE THE RAPIDLY GROWING DIRECTED ENERGY SYSTEMS MARKET



Selected news and programmes from around the world

DIRECTED ENERGY SYSTEMS

AMERICA

UNITED STATES

The US Air Force's Strategic Development Planning and Experimentation office issued a request for information to industry partners about directed energy weapons to counter UAVs.

The request was intended to be market research ahead of an experimentation demonstration coming as part of the Air Force Directed Energy Weapons Flight Plan, which was issued last May. Industry partners were asked to offer information about their ability to provide a directed energy weapons system to target group 1 and 2 UAVs during a counter-UAV operation. The system should work with existing command-and-control systems and may include a modular structure capable of interfacing with existing weapon system platforms and sensors to tailor configuration to task.

At Directed Energy Systems 2018

Michael B. Jirjis, Ph.D., Directed Energy Experimentation Lead, USAF Strategic Development Planning & Experimentation will speak on the roadmap towards operationalising directed energy in the US Air Force.

To counter the proliferating threat of UAVs, the US Army has developed a 'tiered-layered approach', involving multiple countermeasures primarily against both attack and reconnaissance UAVs. These include projectiles fired from land-based Phalanx Weapons System, reconfigurable integrated-weapons platform and the common remotely operated weapons station. These are coupled with the Compact Laser Weapon System, which can be mounted on a vehicle or fixed site; high-energy lasers, which can be mounted on vehicles as small as Stryker; the Coyote Anti-UAS, which is a UAS that crashes into enemy UAS or explodes near them, dispersing blast fragments from its warhead.

Lasers address the 'cost-per-intercept', which would be useful against a swarm of UAS: it means they cannot run out of ammunition as long as they receive power. This tiered-layered approach can be also used against a variety of other threats, such as rockets and artillery, and tactical and intercontinental ballistic missiles.

AMERICA

UNITED STATES (c'td)

The US Air Force Research Lab (AFRL) is undergoing the Self-protect High Energy Laser Demonstrator (SHiELD) programme, which aims to demonstrate that airborne laser technology can disable UAVs and weapons in flight and are mature enough to embeded in aircraft by 2021.
The AFRL has divided the programme in three subsystems allocated to a different defence technology specialist:

- Lockheed Martin is developing the high energy laser, known as Laser Advancements for Next-generation Compact Environments that can be trained on enemy targets to disable them
- Northrop Grumman will build the Turret Research in Aero Effects, the beam control system which will direct the laser onto the target
- Boeing is responsible for the Laser Pod Research & Development, which is a pod attaching the laser to the aircraft and supplying power and cooling

At Directed Energy Systems 2018

Nathan Lockwood, Ph.D., Directed Energy International Programs, AFRL/RD, US Air Force Materiel Command, will give an overview of the SHIELD programme and will present the AFRL's directed energy research portfolio which will form the basis of the next generation of directed energy weapon systems.

Lockheed Martin

The US Navy has awarded Lockheed Martin a USD150 million contract, with options valued up to USD942.8 million for the development, manufacture and delivery of two high power directed energy weapon systems. The system, called High Energy Laser and Integrated Optical-dazzler with Surveillance will include ISR and counter-UAS capabilities and should be finished by fiscal year 2020.

AMERICA

U.S. ARMY EUROPE

The US Army has successfully demonstrated a laser weapon integrated onto a Stryker combat vehicle at the Grafenwoehr Training Area in Germany in March 2018.

The service acknowledges range limitations holding it back from exercising its full capability and training, as all engagements had to be below-the-horizon to ensure proper range safety. As above-the-horizon would have impacted aviation corridors for a few hundreds kilometers, which limits the realism of the training exercise. In light of these limitations, the system operated by the 2nd Stryker Cavalry Regiment was successful and shot down dozens of drones during the live-fire engagement of the 5-kilowatt Mobile Expeditionary High Energy Laser demonstrator.

At Directed Energy Systems 2018

Colonel Sean Wilson, Officer in Charge, Cyber Electromagnetic Activities (CEMA), US Army Europe will deliver a case study on the MEHEL test and will share an exclusive insight on future challenges towards operationalising DE capabilities.

Gary Wood, Ph.D., Chief, Electro-Optics and Photonics Division, U.S. Army Research Laboratory, will share insight on efforts to reduce complexity in future scalable high energy laser weapons.

The focus now for the system is the development of high-fidelity simulation devices and software that allow for joint manoeuvre training, while maintaining eye safe practices. Not only will the development of better simulation techniques benefit directed energy systems, it will also apply to all electronic warfare technologies.

The Army is looking into implementing directed energy for a manoeuvre SHORAD capability on Stryker vehicles and is currently determining whether it can field a laser weapon on a SHORAD system within five years.

EUROPE

GERMANY

The German companies Rheinmetall and Bundewehr have conducted a successful test of a high-energy laser effector. For this test, the 10-kilowatt high-energy laser (HEL) effector was mounted on a MLG 27 light naval gun, aboard a German warship.

The test program included tracking of potential targets, such as UAVs and very small surface craft. Attacks on stationary targets on land were also tested.
The test also demonstrated the effectiveness of the HEL effector technology in maritime operations. It revealed important insights for the development of future HEL naval effectors.

Besides mortars interception, the laser effector is capable of destroying optic means within a few kilometers radius, whether it is sniper's telescopic sights, stationed cameras, UAV's payloads, and more.

RUSSIA

The Russian Ministry of Defence announced in March that it had excellent results in research and development work on its next-generation high-powered laser weapon system Peresvet, a vehicle-mounted combat land system.
In July, the Ministry of Defence claimed the system was already in service and deployed in the place of permanent stationing.

EUROPE

UNITED KINGDOM

Defence Secretary Gavin Williamson unveiled at Farnborough Air Show a full-scale model of the Tempest, the UK's concept for a domestically built twin-engine stealth fighter that is expected to possess directed energy weapon systems among others sixth-generation technologies.

The aircraft is to enter service in the 2030s and will be fitted to include and power directed energy weapons, as it would generate large quantities of electricity through magnets in the turbine cores. These would range from lasers to microwaves and will be used for non-kinetic purposes.

At Directed Energy Systems 2018

Keith A. Rigby CEng FIET, Principal Technologist - Weapons Integration, Future Combat Air Systems, BAE Systems will share an exclusive insight into integrating LDEW capability into platforms.

The MoD have announced that a £30 million deal for a new British laser weapon system, for use on land and at sea, has been finalised.
The contract was awarded to 'UK Dragonfire' a consortium comprising the companies MBDA, Qinetiq, Leonardo-Finmeccanica GKN, Arke, BAE Systems and Marshall ADG UK.
According to the MoD the programme will develop technologies for a high energy defensive laser weapon system in the 50kW class.
The Laser Directed Energy Weapon (LDEW) Capability Demonstrator is set to be built by MBDA UK Ltd and a prototype delivered by 2019.

At Directed Energy Systems 2018

Matt Speakman, Assistance Head for Novel Weapons, Weapons Evaluation and Capability Assurance, Finance & Military Capability Group UK MoD will be speaking about transitioning DES into service with a focus on the balance of investment decisions

ASIA PACIFIC

AFGHANISTAN

The Zeus Laser Weapon, employed by the U.S. Army in Afghanistan, was the first U.S. Directed Energy System to be used on a battlefield. This was primarily used to neutralise mines and unexploded ordnance and is reported to have a 98% success rate. The Afghan Air Force plans to expand the use of the most advanced technology in directed energy to conduct high-precision attacks on Taliban militants. A spokesman for the Air Force noted the use of this kinetic weapon will add to the accuracy of guidance and will hopefully help the army reduce civilian losses during airstrikes.

CHINA

According to a US intelligence report, China along with Russia are developing 'destructive counterspace weapons' which could be ready to use in 'the next few years'. The report outlines the recent military reforms in the two countries as an indication of an increased focus on establishing operational forces designed to integrate attacks against space systems.

China is believed to have begun initial testing for counterspace weapons and has formed specific military units to operate ground-based anti-satellite ballistic missiles. The US believes both China and Russia are building directed energy weapons that could be used to damage sensitive space-based equipment.

ASIA PACIFIC

INDIA

India has made a breakthrough in its efforts to develop directed energy weapons, as the Defence Research and Development Organisation recently conducted a successful test of a 1KW laser weapon system mounted on a truck.

The Centre for High Energy Systems and Sciences and the Laser Science & Technology Centre are currently working on developing the source for generating the laser, as it is currently imported from Germany.

In 2013, the nation's ministry published the Technology Perspective & Capability Roadmap document, outlining a key requirement of electromagnetic pulse weapon for countering missiles fired at ships, tanks and aircraft.

SOUTH KOREA

South Korea has plans to build a laser weapon system to better deal with UAVs threats. The Ministry of National Defence plans to develop laser technology this year to shoot down UAVs as part of its broader laser weapon system that would intercept small drones along with a wireless power transfer system to improve operational capabilities.

The push for this interceptive system was motivated by several sightings of UAVs allegedly coming from North Korea around the border.

The Republic of Korea wants the system that could intercept drones ready this year and the overall system by 2021.

At Directed Energy Systems 2018

Tae KIM, Ph.D., Principal Researcher, 1st Ground Weapon Systems PM Office, South Korea Agency for Defense Development will share insights into laser developments in the Republic of Korea including feedback from recent C-UAS laser prototype and how lasers are being viewed from a national defence perspective.

Defence iQ *presents the 12th Annual*

DIRECTED ENERGY SYSTEMS

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- **Explore new concepts for the use of DES** – from offensive and defensive military systems as well as non-lethal crowd control. What are the pros and cons for the use of these weapons in a civilian setting?
- **Learn how to communicate the value of DES systems to decision makers** through an understanding of the latest advances that justify upfront investment