

MULTITECH Ltd. (*MPB Spectrum* before 2000) incorporated in 1991. The company specializes in high-technology and R&D, paying particular attention to design and manufacturing laser technique, laser electronics and optics and developing laser processing technology

MULTITECH Ltd.

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About the Company

MULTITECH Ltd. is based in St.-Petersburg, Russia. The company researches in laser design and technology and manufactures wide range of laser electronics and completed laser systems. **MULTITECH Ltd.** collected high-educated specialists from leading scientific centers of St.-Petersburg being able to solve complicated problems in quantum electronics and optics area.

MULTITECH Ltd. OFFERS:

- electronics and optical units for solid-state pulsed lasers, diode- or flashlamp-pumped, production-run or experimental custom designed;
- custom designed pulsed laser systems for industrial, science and other applications;
- registration systems for laser diagnostics devices;
- experimental-industrial technological complexes for laser microprocessing;
- high-tech instruments for laser-based methods of scientific investigations;
- R&D in laser physics.

Pulsed Laser Systems

MULTITECH's pulsed laser systems might be conventionally divided into two main groups: flashlamp-pumped solid-state pulsed laser systems and diode-pumped solid-state pulsed laser systems.

Company's designed single- and many-stage flashlamp-pumped laser systems has found their applications in various areas of scientific investigations provided by our customers.



Orion-series lasers with multiple wavelength and multiple pulselength give the opportunity to use laser radiation ranged from 270 up to

1900 nm.

Recently supplied to customer two-stage laser system "LAPLAS" is intended to work as a part of X-ray spectroscopy laboratory. This laser consists of master oscillator



and optical amplifier with Stimulated Brillouin Scattering compression. Pulse energy is up to 200 mJ, pulsewidth is about 0.4 ns.

M-600-1000 system	
Power Supply	PULSAR-200 (MULTITECH)
Cooling system	TECS-200 (MULTITECH)
	LCS-16-1000 (MULTITECH)
Pulse energy	5 mJ
Wavelength	1064, 532 nm
Repetition rate	1000 Hz
Pulsewidth	9 ns
Applications	Glass art

Lidars

MULTITECH's flashlamp-pumped laser systems became the base of new airborne lidar construction developed by company specialists. For two last years, this lidar (named **PAL-1**) has been successfully working among oceanology equipment of Knipovich Polar Research Institute of Marine Fisheries and Oceanography (Murmansk).

PAL-1M system	
Power Supply	PLPS-1000 (MULTITECH)
Cooling system	LCS-25-1000 (MULTITECH)
Registration system	Originally designed by MULTITECH
Number of optical receivers	3
Pulse energy	120 mJ
Wavelength	1064, 532 nm
Repetition rate	1-40 Hz
Pulsewidth	10 ns
Applications	bathymetry, fish locating

Another branch of MULTITECH's laser tree is diode-pumped laser systems set. Company scientist's professional skills in laser design allowed to create number of systems (**M-600-1000, PAPERLAS, EL-40, TWL**, etc.) aimed to various scientific and industrial applications (spectroscopy, range finding, laser processing and physiotherapy). Compactness, high repetition rate and high technical level distinguish these diode-pumped laser systems.

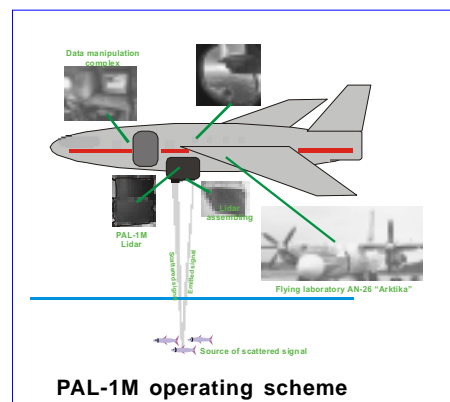


PAPERLAS system

PAPERLAS system	
Power Supply	PULSAR-200 (MULTITECH)
Internal water cooling system	
Pulse energy	1 mJ
Wavelength	1064 nm
Repetition rate	100 Hz
Pulsewidth	15 ns
Applications	Spectroscopy, physiotherapy

Er-glass lasers (diode- or flashlamp-pumped) emit laser radiation in IR spectral range, safe for human eye. This makes them ideal for use as essentials of range finders and lidars suitable for populated areas.

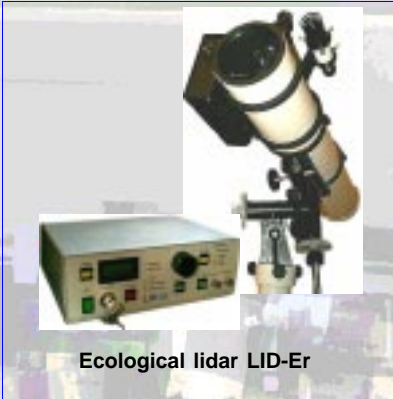
EL-40 system	
Power Supply	PULSAR-200 (MULTITECH)
Air cooling	
Pulse energy	50 mJ@10 ms, 10 mJ@30 ns
Wavelength	1535 nm
Repetition rate	10 Hz
Pulsewidth	1-10 ms, 30 ns



PAL-1M operating scheme

■ LID-Er portable lidar is aimed at ecological problems. Its destination is atmospheric monitoring, smoke and pollution finding, flying objects locating etc. Eye-safe radiation makes it suitable for using at populated areas.

LID-Er system
 Power Supply Originally designed by MULTITECH
 Cooling system None
 Registration based on TAL-1 amateur telescope construction system
 Active media Er-glass
 Wavelength 1535 nm
 Pulse width 25 ns
 Repetition rate 0.08 Hz
 Application Atmosphere monitoring



Ecological lidar LID-Er

TOKAMAK laser diagnostic system

■ The intracavity laser system for high-resolution Thomson scattering on tokamak plasma was created in cooperation with Ioffe Institute on demand of FOM-instituut voor Plasmafysica "Rijnhuizen", Netherlands. The construction of power supply system is based on original technical solutions developed in **MULTITECH** company.

InLight diagnostic system
 Power Supply **MegaWatt** (MULTITECH)
 Main bank capacity 242 mF
 Add. bank capacity 36 mF
 Main bank voltage 1000 V
 Add. bank voltage 2000 V
 Number of add. banks 3
 Maximal current 1000 A
 Number of discharge channels 6
 Discharge pulse duration 3–10 ms

Control Crate

Trigger Crate



Laser Emitter



InLight diagnostic system

Main Bank

Three Additional Banks

MegaWatt power supply

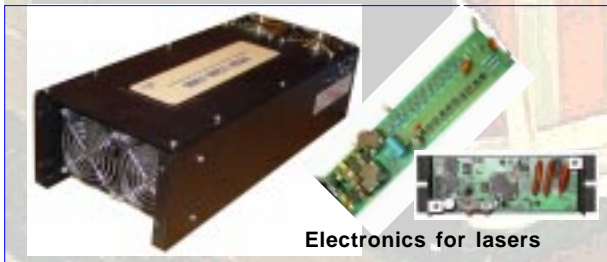


Laser Electronics

Company production represents whole spectrum of electronics for pulsed laser solid-state systems.

Serial productions of MULTITECH Ltd. are single-stage and double-stage flashlamp-pumped pulsed laser power supplies (**PLPS-1000, PLPS-1000x2**).

Diode-pumped pulsed or continuous laser power supplies (**Pulsar-200, CODLA**) can be widely varied by their working parameters, determined by customers demand. Power supplies of **Pulsar** series may be fitted with laser thermoelectric cooler drivers.



Electronics for lasers



Pulsar series



PLPS series

Among **MULTITECH Ltd.** laser electronics one should mention set of active liquid-free thermoelectric coolers with power supplies, Q-Switch drivers, Capacitor Charging Power Supplies and electronics for registration systems.

All high-level devices, such as cooling systems and power supplies, have control electronics and I/O interface, which allows to monitor and change distantly working parameters and provide full remote control via PC.

MULTITECH Ltd. manufactures set of effective laser coolers used in laser optics. This is systems with passive water-water or water-air heat-exchangers and active Peltier-based heat exchangers.

Liquid Cooling Systems



LCS series

MULTITECH Ltd. produces series of Laser Cooling Systems (LCS) with passive water-air heat-exchangers. From model to model, laser coolers vary by their thermal resistances, water fluid rates and dimensions.

Modification	LCS-25-1000	LCS-16-1000	LCS-5-1000
Thermal Resistance	25 K/kW	16 K/kW	5 K/kW
Fluid Rate	4.5 l/min	6 l/min	25 l/min

Having looked at problems of effective cooling of diode-pumped laser systems, researchers of **MULTITECH Ltd.** develop series of liquid laser chillers with active water temperature-stabilized Peltier-based water-water heat-exchangers (**TECS**).



TECS series



Laser Processing Technologies

■ One of the most important occupations of **MULTITECH Ltd.** scientists is investigation in perspective and rapidly developing direction of high-end technologies – laser micro-machining. Particular attention to this industrial area is that, as a law, it does not need any powerful lasers, which lets construct compact, package processing units.

■ Rich resources and ability of personnel in manufacturing lasers allow to select and study optimal technical conditions for laser scribing, cutting, perforation and cleaning firm materials.

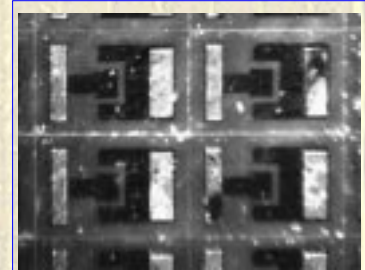


Perforation of titan

■ The company specialists create experimental setups for laser perforation and cutting the firm and extra-firm materials (metals, transparent dielectrics, semiconductors). They determine optimal conditions for such processes as laser ablation of the isolation from conductor's surface (copper).

■ During last years **MULTITECH Ltd.** has been developing the family of new technologies for materials laser processing. Recently we have created and tested a novel technology of laser splitting of sapphire wafers which are used in Light Emitting Diodes manufacturing. In contrast to all existing methods, the technology proposed by our company has series of essential advantages.

Prototype model of setup for sapphire wafer cutting has already realized. With this setup, one cut the wafer along an arbitrary contour and then provides fast and sharp division of microchips without any additional devices. All operations of the setup processing are highly automated: movement of the pattern under processing, laser operations and parameters controls by computer.



Wafer micro-cutting



New sapphire cutting method features

Low width of cutting line: the width does not exceed 5-10 μm , depending of pattern thickness

High precision of cut positioning (better than 5 μm)

Possibility of splitting the wafers of considerable thickness (up to 500 μm and more)

High cutting speed, 5-10 mm/s on wafers with thickness up to 200 μm

Exclusively high output of correct chips: more than 98% for wafers of up to 200 μm thickness and more than 75% for wafers with thickness up to 500 μm

Possibility of cutting the wafers covered by plastic protecting films or by thin epitaxial Si or GaN layers without damaging the layers

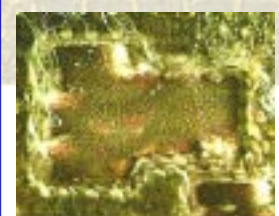
No thermal or another detrimental effects on the semiconductor structure

No evaporated matter

No cooling, lubricating and other liquids or reagents

Longevity of cutting tool

High level of automation of entire process



Isolation ablation

In the end of year 2003 **MULTITECH Ltd.** plans to begin the sales complete industrial equipment.