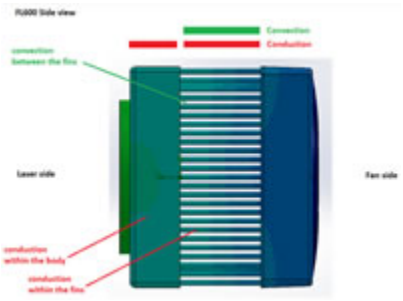
ePulse: Laser Measurement News
May 2022

Welcome to **ePulse: Laser Measurement News**, a review of new developments in laser beam measurements, beam diagnostics, and beam profiling. Each issue contains industry news, product information, and technical tips to help you solve challenging laser measurement and spectral analysis requirements. Please forward to interested colleagues or have them subscribe.

Features

Evolution of Measurement Technology for Laser-Based Additive Manufacturing Systems
By Nicolas Meunier, Business Development Manager, High Power & Automotive
Four years ago, MKS introduced the first measuring device that could assess - without any contact - the caustics of a laser beam on a build plane. This was followed by the launch of the innovative Ophir Ariel power meter for AM applications. Then at Laser World of Photonics 2022 in Munich, we introduced the Ophir BeamPeek™ integrated measuring system that bundles measuring tasks into one robust system suitable for both NIR and green lasers. Here's how support for AM systems has evolved. Additive Manufacturing.

High Power Laser Cooling Methods
By Asher Izsak, R&D, Ophir Products
Choosing the right heat control method is one of the most important considerations when choosing a suitable laser power measurement sensor. This article looks at the different cooling technologies used in high-power laser measurement sensors. It also examines the changing requirements of the cooling system as power levels of the laser increase, and considers how these are met by fan and water cooling methods. Laser Cooling.

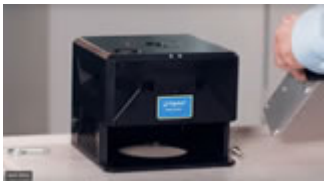


Repair & Recalibration

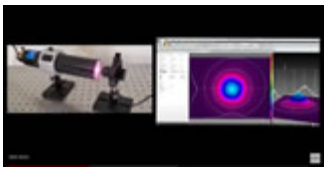
I'm Not Required to Calibrate My Equipment Based on ISO or FDA Requirements. So Why Should I?
By Kristen Winterton, Calibration Manager, Ophir Products
At its core, calibration is about ensuring that your equipment is working properly and in the way it is intended. Returning your equipment for periodic calibration allows for several things to take place including evaluation of your equipment for damage, opportunities for us to provide education, and upgrades to your firmware, as well as the sensor-to-sensor comparison to our NIST-traceable masters. Why Calibrate.

Videos of the Month

High Power Laser Beam Analysis and Power Measurement System for Additive Manufacturing
Ideal for field service testing of AM chamber powder beds, the Ophir BeamPeek system provides simultaneous beam profiling, focal spot analysis, and power measurement in just three (3) seconds. No need for water or fan cooling as the system includes a replaceable passive cooling beam dump tray that eliminates downtime between measurement sessions. Ophir BeamPeek.



Measuring Large and Divergent Beams
The Ophir WB-I SWIR Wide Beam Imager accessory is designated for SWIR 900-1700nm, especially the popular 1550nm wavelength. It's a compact system for measuring the size and power distribution of large and divergent beams of VCSELs, LEDs, and large lasers. WB-I Wide Beam Imager.



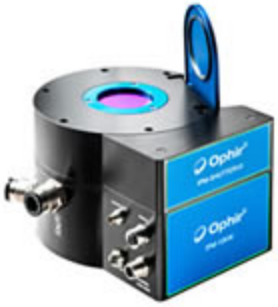
Ophir MWIR f/5.5 VGA Extended Range, Continuous Zoom Lenses
The new 30-385mm, 50-700mm, and 80-1200mm f/5.5 lenses enable longer detection, recognition, and identification (DRI) ranges with a compelling combination of performance, reliability, and cost. These lenses are designed for anti-drone applications and ideal for long range observation and surveillance systems with vehicle

What's New

High Power Beam Analysis and Power Measurement for Additive Manufacturing

The Ophir BeamPeek™ integrated beam analysis and power measurement system enables fast, accurate, real-time measurement of lasers in additive manufacturing chambers. The system provides simultaneous beam profiling, focal spot analysis, and power measurement in just three (3) seconds. There is no need for water or fan cooling as the system includes a replaceable passive cooling beam dump tray that eliminates downtime between measurement sessions. Ideal for field service testing of AM chamber powder beds. Ophir BeamPeek.

Modular High Power Industrial Laser Power Sensor for Dusty, Dirty Production Operations



The Ophir IPM-10KW modular high power laser power sensor delivers high accuracy and repeatable measurements in rough production environments. It measures powers from 100W to 11kW for wavelengths from 900 to 1100nm, and 10.6µm. The sensor's modular format allows users to mix and match components based on application needs. An optional automated shutter with a field replaceable window protects the sensor against dust and debris. Optional communication modules provide Profinet or EtherNet/IP connectivity. Ophir IPM-10KW.

Laser Power Sensor Measures High Repetition Rate, Short Pulse Industrial Lasers

The Ophir F150(200)A-CM-16 thermal sensor is a state-of-the-art device for measuring high repetition rate lasers with very short pulses in the nano, pico, and femto second ranges. This compact, calibrated, fan cooled sensor supports high rep very short pulse lasers with average power up to 200W. It accomplishes this without a diffuser, thus alleviating the problems related to contamination on the diffuser. The F150(200)A-CM-16 sensor can withstand higher power densities and measure continuously average power up to 150W and intermittently up to 200W. Ophir F150(200)A-CM-16 Sensor.

Long Range Ruggedized f/5.5 Continuous Zoom Lenses

The Ophir SupIR 30-385mm, 50-700mm, and 80-1200mm MWIR f/5.5 lenses are designed for 15µm pitch VGA FPA (focal plane array) cooled MWIR detectors. They enable longer detection, recognition, and identification (DRI) ranges, exceeding 26km (using the SupIR 80-1200mm lens). An industry-leading combination of performance, reliability, and design-to-cost make these lenses ideal for the demanding requirements of extended observation and surveillance systems in both defense and commercial markets. f/5.5 Continuous Zoom Lenses.

Long Range Ruggedized f/4 Continuous Zoom Lenses

detection range capabilities exceeding 26km. f/5.5 Continuous Zoom Lenses.

Social Media: Blog

Ophir Audible Channel

Thanks to our new collaboration with Summurai, we now offer the best of Ophir content (blog posts, articles, white papers) summarized & read out loud. Think of it as a hybrid between reading and podcasting. The Playter® widget allows you to choose whether to read content or listen, now or later. This makes it easy to obtain the latest knowledge whenever and wherever - driving, shopping, or walking your dog. You can also create their own playlist and share it with colleagues through social media. Ophir Audio Blog.

Things to Remember When Setting Up Laser Measurement Equipment for the First Time

Before selecting equipment to measure laser performance characteristics, you should have a basic understanding of how your laser behaves as that will likely define which measurement products you select. Is your laser continuous-wave (CW) or pulsed, and what is the difference? What is laser power? What is laser energy? And what is their relationship? Setting Up Measurement Equipment.

Understanding Your Laser Measurement Equipment Certificate of Calibration

To ensure laser power sensors remain accurate, they must be calibrated regularly. When you receive the sensor back from calibration, you will see a certificate of calibration (CoC). Here's what it means. Certificate of Calibration.

New Catalogs: Power Meters, Beam Profiling, IR Optics

The 2022 Ophir Laser Measurement Catalogs include tutorials and product specifications for laser power meters and beam profiling

The Ophir SupIR 60-1200 MWIR f/4 lens is the latest addition to the company's series of lenses designed for SXGA/HD 10µm and 15µm VGA pitch FPA (focal plane array) cooled MWIR cameras. This high precision lens is equipped with an automated zoom interface and continuous zoom to provide a sharp and clear image across the entire field-of-view and throughout the full zoom range. This makes it ideal for the demanding requirements of Counter Unmanned Systems (C-UAS) applications and long range observation and surveillance systems. f/4 Continuous Zoom Lenses.

Ophir Optics Group Receives BAE Systems Supplier Award

The Ophir Optics Group has been honored with a 2021 Gold Level Supplier Award from BAE Systems Electronic Systems. BAE Systems Electronic Systems develops and delivers a wide range of advanced technology-led solutions for the commercial and military electronics markets, and is a leader in the field. The award, announced on March 28, 2022, acknowledges that Ophir provides consistent on-time product deliveries with 100% quality. Supplier Award.

Webinars

Measuring Long-Wavelength Lasers
Speaker: Kevin Kirkham, Senior Business Development Manager, Ophir Products
Date: June 7, 2022, 1pm EDT/5pm GMT
Numerous products and techniques have been developed to enable the measurement of beam quality parameters for long-wavelength light sources. Kevin Kirkham presents the types of measurement tools that are available for long-wavelength sources, and he helps determine which tools are appropriate for different application types. Long-Wavelength Lasers.

Material Micro Processing: Laser Measurement Solutions
Speaker: Mark Slutzki, Product Manager, Ophir Products
On-Demand
Micro processing is challenging: drilling via holes in PCBs, OLED display "lift-off", cutting smartphone cover glass. The often delicate combination of laser parameters - ultra short pulse duration, high repetition rate, perhaps short wavelength - can enable new and innovative processes, but can also cause unexpected damage to the measurement tools you are trying to use to keep the process stable. Mark Slutzki talks about these challenges and new approaches for monitoring beams in micro processing applications. Micro Processing.

Understanding Laser Energy Measurement
On-Demand
If you need to measure laser pulse energies, you have probably run into a variety of issues and concepts that seem to just cause confusion. In this webinar, you will learn how energy measurement works, how to make sure you are getting accurate readings, how to avoid out-of-tolerance issues with your measuring tools, and more. Laser Energy Measurement.

Troubleshooting Your Lasers
Speaker: Derrick Peterman, PhD, Director of Sales, Ophir Products
On-Demand
From the 2022 SPIE Defense and Commercial Sensing trade show, Derrick Peterman talks about solutions for troubleshooting lasers. He shows MKS' newest Ophir products that can help diagnose issues for systems.

The 2022 Ophir IR Optics Thermal Imaging Lenses Catalog includes a wide range of LWIR and MWIR 1-FOV, Multiple FOV, and continuous zoom lenses.

MKS Newsletters

TECHinnovations Newsletter for the latest on vacuum, power solutions, gas delivery and analysis, plasma generation, and ozone solutions for semiconductor and advanced markets from MKS.

Focus on Photonics Newsletter for innovations in lasers, opto-mechanical components, vibration and motion control, and laser characterization.

Trade Shows

Eurosatory, France
June 13-17, 2022
Hall 6 D492
Paris, France

CIOE 2022
September 7-9, 2022
Shenzhen, China

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optimal performance. Troubleshooting Lasers.

Blue/Green Lasers in Battery Production
Speaker: John McCauley, Senior Business Development Manager, Ophir Products
On-Demand
Near infrared fiber lasers are used to weld battery housings, but the emergence of blue and green lasers is a productive alternative as they weld quicker, more efficiently, and with higher-quality results. But copper absorbs infrared laser wavelengths differently than blue and green wavelengths. John McCauley discusses this challenge and how the quality of weld-spots or weld-seams exerts a decisive influence on the safety and reliability of the parts produced. Blue/Green Lasers.

Measuring the Power and Beam Profile of Divergent Lasers
Speaker: Derrick Peterman, PhD, Director of Sales, Ophir Products
On-Demand
Large beam divergences create challenges for reliably characterizing lasers, primarily because the beam size from such lasers grows quickly over a short distance, and beam conditioning optics and sensors used to measure these beams can have a strong angular dependence. In this webinar, Derrick Peterman discusses methods for reliably characterizing the beam power and profile of divergent sources, so that users will be able to better understand how their lasers are performing in critical applications. Divergent Lasers.

Research News

Single-Shot Femtosecond Bulk Micromachining of Silicon
A novel photonics platform for high-speed data transfer and optical memory demands higher flexibility of the silicon modification, including on-chip and in-bulk inscription regimes. This research investigates a new approach for deep 3D single-shot bulk micromachining of silicon using mid-IR tightly focused beams. A 3D propagation imaging (fluence) technique using the Ophir Pyrocam is used to estimate energies. Silicon Micromachining.

Evaluation of Stereolithography-Based Additive Manufacturing Technology
A piezoceramic $BaTiO_3$ material that is difficult for 3D printing was tested with a homemade laser-based stereolithography (SLA) setup. A spectral change to 465 nm was realized in this work via a robot-based experimental SLA setup to improve the 3D printing efficiency. Laser power was measured with an Ophir Laser Power Meter. Stereolithography-Based Additive Manufacturing.

FAQs

Power Meters
I want to know the "bottom-line" accuracy I can expect in my measurement. My sensor's datasheet gives a list of "additional error with..." factors, such as wavelength, frequency, linearity. How do I combine all these, so that I know how accurate my results are? Read the FAQ.

How close can I come to my sensor's damage threshold? Does it matter if I do so for just a short time? Read the FAQ.

Beam Profiling
When I run BeamGage with my beam profiling camera it is prompting for a license key. Where can I find it? Read the FAQ.

Where can I find technical specifications for my discontinued Ophir-

Spiricon beam profiling camera? Read the FAQ.

About Ophir

Ophir is a brand within the MKS Instruments Photonics Solutions Division. The Ophir product portfolio consists of laser and LED measurement products, including laser power and energy meters, laser beam profilers measuring femto-watt to hundred-kilowatt lasers, high-performance IR and visible optical elements, IR thermal imaging lenses and zoom lenses for defense and commercial applications, OEM and replacement high-quality optics and sub-assemblies for CO_2 and high-power fiber laser material processing applications. Ophir products enhance our customers' capabilities and productivity in the semiconductor, advanced electronics, and specialty industrial markets. For more information, visit www.ophiropt.com.

3050 North 300 West, North Logan, UT 84341
Tel: +1 435-753-3729
www.ophiropt.com/photonics