MWL LASER MANUFACTURING WEEKLY

From PFAS-Free Coatings to Smarter Laser Safety Controls

Second Edition | August 7, 2026 | Four stories worth your time + one MWL resource

OPENING NOTE

This week's issue looks at the less glamorous work that turns laser technology into a dependable manufacturing process. Fraunhofer ILT is developing localized laser methods for applying PFAS-free functional coatings. Chiba University is investigating whether the tiny recoil force created during ablation can provide real-time feedback on processing depth and breakthrough. A second Fraunhofer story follows extreme high-speed laser material deposition from development into automotive series production.

The fourth story moves from the process to the safety-related control system. Lasermet's new ICS-Magellan interlock controller uses a modern touchscreen for visibility and operation while keeping critical safety functions in dedicated hardware. That separation is worth discussing because a better interface can make a laser system easier to understand, but the interface should never become a substitute for a properly designed and validated safety architecture. At the end, I have included a new MWL Resource section with our free eBook, What You Need to Know About Handheld Laser Welding.

1. Laser Processing May Help Make PFAS-Free Industrial Coatings Practical

Fraunhofer Institute for Laser Technology ILT | July 30, 2026

Fraunhofer ILT is developing laser-based processes for applying PFAS-free functional coatings to large metal components, plain bearings, seals, and sensitive elastomer rollers. The work spans several projects and includes laser deposition, localized melting, and selective surface structuring.

The researchers are not treating PFAS replacement as a simple material substitution. Alternative materials still have to bond to the substrate, survive heat and mechanical loading, and be applied economically. Localized laser energy may allow engineers to melt or structure a coating without heating an entire multi-ton component in a furnace or damaging a heat-sensitive substrate.

WHY IT MATTERS

> This is a good reminder that a new material is not a finished manufacturing solution. The coating, substrate, surface preparation, heat input, adhesion, geometry, and production method all have to work together.
>
> Lasers can be valuable because they place energy where it is needed and limit the heat delivered to the rest of the component. The real value, however, comes from developing a controlled process that can be scaled, inspected, maintained, and justified against the existing method.

Original source: PFAS-free coatings: Fraunhofer ILT develops laser-based manufacturing processes for industrial functional coatings

2. Can a Load Cell Tell a Laser When It Has Cut Through?

Chiba University | July 27, 2026 | Study available online in Optics & Laser Technology

Researchers at Chiba University tested a monitoring method that measures the very small recoil force created when laser pulses heat and vaporize material. In experiments on silicon, the recoil signal changed predictably with pulse energy, focus position, and processing depth.

As the laser drilled deeper, the measured force declined. When the wafer was fully penetrated, the signal showed a distinct change that could identify breakthrough in real time. The researchers also reported a processing-depth estimate with a relative error of 24.3 percent and suggested that the method could eventually support automatic adjustment of laser cutting conditions.

WHY IT MATTERS

> I like this story because useful process feedback does not always have to come from a camera, OCT system, or complicated optical sensor. Sometimes a physical signal that is already part of the process can tell us something important.
>
> This is still research, not a ready-made production control. A 24.3 percent depth error would not be sufficient for many precision applications by itself. The next questions are repeatability, sensitivity to fixturing and machine vibration, calibration across materials, and whether the signal remains useful at production speeds.

Original source: Monitoring Laser Ablation in Real Time: Detecting Wafer Penetration through Recoil Force

Related reference: Original research DOI

3. EHLA Moves from the Lab into Automotive Production

Fraunhofer Institute for Laser Technology ILT | July 23, 2026

Fraunhofer ILT and South Korean automotive supplier ILJIN developed an extreme high-speed laser material deposition (EHLA) coating for the contact surface between an electric-vehicle wheel bearing and driveshaft. The goal was to reduce a metallic ping caused by stick-slip movement at the interface without adding another component or relying on a PFAS-containing solution.

EHLA melts metal powder in the laser beam before it reaches the part, allowing a thin, metallurgically bonded functional layer to be deposited with limited heat input. Fraunhofer reports that the coating was qualified through bench and vehicle testing, received its first production order, and is moving into high-volume automotive production.

WHY IT MATTERS

> This is the kind of additive manufacturing story I find especially useful. It is not about printing a complete part or making a dramatic demonstration. It is about placing a small amount of material exactly where it changes the function of a mass-produced component.
>
> The important advance is not EHLA by itself. It is the work required to make the coating bond, limit heat input, survive real loads, fit an automated line, and meet cycle-time and quality requirements. That is the difference between an interesting laser process and a dependable manufacturing process.

Original source: EHLA Brings Peace and Quiet to Electric Vehicles

4. A Modern Touchscreen for Laser Safety—Without Making the Screen the Safety System

Lasermet | July 2, 2026 | Product announcement

Lasermet has introduced the ICS-Magellan, a centralized laser interlock controller intended for complex laser-controlled environments with multiple doors, shutters, emergency stops, active guarding devices, lasers, or safety zones. The system combines a 10.1-inch touchscreen and keycard access with up to four dual-channel interlock inputs, three independently controlled interlock outputs, and control for one laser beam shutter.

Lasermet says the controller is capable of achieving up to Performance Level e under ISO 13849-1. The design point that caught my attention is the separation between the user interface and the safety function: monitoring and authorized control are presented through the touchscreen, while safety-critical interlock functions remain in dedicated hardware that is independent of the software and operating system.

WHY IT MATTERS

> A clearer interface can make a complex laser system easier to operate and troubleshoot, especially when several doors, shutters, zones, and lasers must work together. But a touchscreen is not a safety function. It is a way to see and command the system.
>
> I have built Class 1 laser systems with light-tight enclosures and dual-channel monitored safety controls. In that kind of design, the HMI and the safety architecture have different jobs. The HMI should help people understand the machine state. The safety-related control system must still fail safely, detect faults, and be validated for the actual hazards and installation. The phrase “up to PLe” is important: it describes a capability, not an automatic performance level for every completed system.

Original source: Introducing the ICS-Magellan: Lasermet’s Advanced Touchscreen Laser Interlock Controller

Related reference: ICS-Magellan product details | ISO 13849-1:2023 | ISO 13849-2:2012 validation

MWL RESOURCE

Free eBook: What You Need to Know About Handheld Laser Welding

MWL created this practical guide for shop owners, welders, supervisors, students, and manufacturers who are considering handheld laser welding or are still developing their process.

It covers safety and fume control, equipment and supporting systems, material preparation and fit-up, technique, process development, documentation, inspection, troubleshooting, maintenance, and an introductory look at cobot integration.

The goal is to help readers ask better questions and understand that the laser is only one part of a complete manufacturing process.

Download the free guide: What You Need to Know About Handheld Laser Welding

CLOSING THOUGHT

These stories all point to the same lesson: the laser may be the most visible part of the system, but dependable manufacturing comes from the materials, sensing, controls, qualification, safety architecture, and production discipline around it.

Which part of a laser project is most likely to be treated as an afterthought until late in the program—process monitoring, transfer to production, or safety-related controls?

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