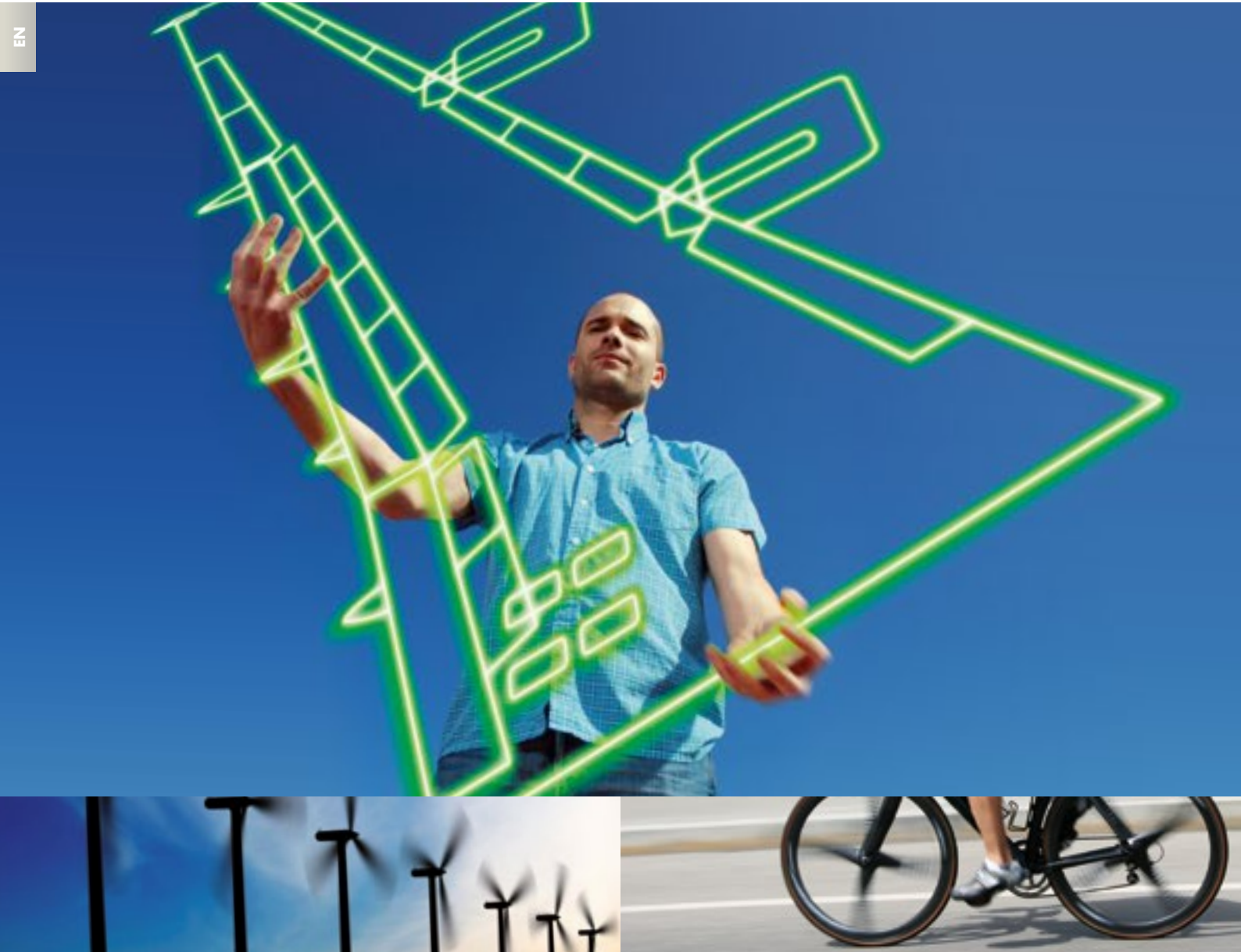


COMPOSITE **PRO**

LASER PROJECTION SYSTEM

for the production of or with composite materials



VIRTUAL TEMPLATES FOR 3D POSITIONING.
FAST, PRECISE, CLEAN.





Reinforcements

Pre-Pregs

Carbon fiber

Panels

Glassfiber

Fuselage

Kevlar

Hulls

Polymers

Wings

Wood

Tails

Metal

Blades

Ceramics

Frames

Bodies

Tanks

COMPOSITE PRO – THE DIGITAL LASER TEMPLATE FOR COMPOSITE MATERIALS



COMPOSITE PRO is a laser system for projection of polylines or outlines onto working surfaces, work pieces or moulds. Laser lines are generated based upon CAD data. The projected shapes are true to scale. With COMPOSITE PRO you optimize

workflow and quality of your production. Independent of industry, material and product, you may work faster, more flexible and cleaner than with conventional templates or measuring aids.

During production scheduling, you no longer need the manufacturing and management of mechanical templates and measuring tools. For changes in design, you only need a new projection file. Don't waste time for unnecessary intermediate steps! Even small batches or prototypes may be handled fast and easily.

Planning of working places is flexible: you may place projectors and touch screens as required, fixed or moveable. Select several teams to work at different locations of a large object simultaneously. Or to work on several small work pieces. Or both. Distribute projection capacity by workload – take advantage of the LAP Optogroup Client-Server concept.

During work, you can project lines in green, red or yellow (LAP Multicolour), no matter if you use one projector or a group of them. You may even change the colour within an outline. Separate or group working steps, pre-cuts or different materials by colour. Display warning notices, information or numbering.

Is the surface of your work piece sensitive to pressure, organic or inorganic dirt? No problem – lasers work without contact. There is no danger, neither for your work piece nor for your employees.

Last, not least: we take care that you can optimally use your working times. You may select different service options to give you the security of protection against downtime tailored to your individual requirements.

Take a step into the future – with LAP COMPOSITE PRO laser projection systems.

Take advantage of **COMPOSITE PRO** for your production of and with composite materials:

3 IN 1

COMPOSITE PRO is a complete system of perfectly harmonised components: user interface, projection system and service.

FLEXIBLE

The unique LAP Optogroup client-server concept offers real multitasking for teams working with different tools using shared resources.

MORE THROUGHPUT

Increase of productivity by up to 100 % due to omission of conventional templates and better management of workflows.

MORE PRECISION

LAP laser projection systems work digitally and in real-time. Typical sources of analogue errors like drift are compensated for at once. Change of outlines happens instantaneously, without idle time.

CLEANER

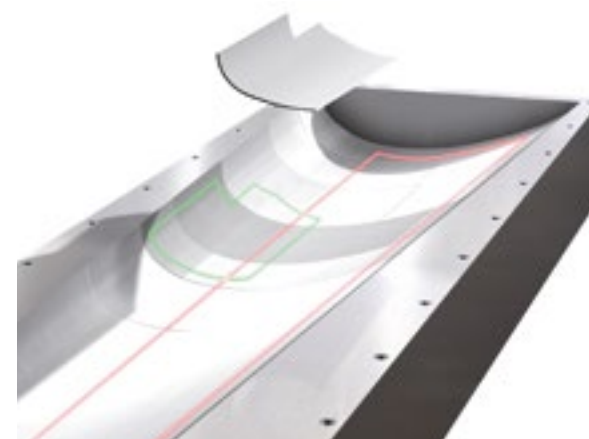
Laser work without mechanical contact to the work piece. The surface is only touched by the material to be placed.

MORE CONTROL

The workflow is displayed and saved on the PC step by step. Placed parts may be checked later.

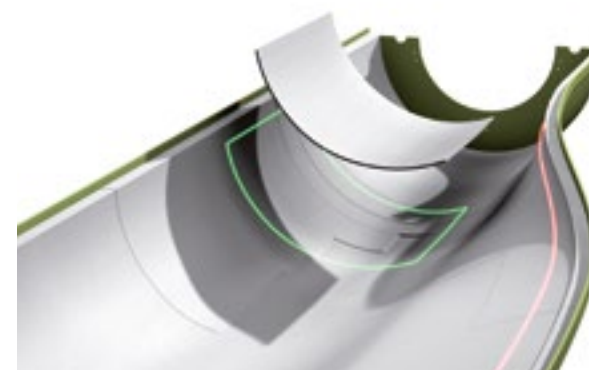


COMPOSITE PRO – DESIGNED TO MEET EVERY INDUSTRIAL CHALLENGE



AEROSPACE INDUSTRY

Carbon fibre parts are state of the art in today's lightweight design. For their production it's impossible to even think of doing without laser projection systems. But you have to meet the needs if you don't want to vanish into thin air. LAP has accepted the challenge and belongs to the established group of worldwide providers of laser projection systems today. A significant achievement to date is our appointment as "Strategic Partner" of EADS/AIRBUS. LAP's customer list also includes a lot of sub-suppliers and specialised companies.



WIND ENERGY

The attraction of renewable energies is still growing, and for profitable production the size of wind power plants has to increase – and so do the rotor blades. Use of glass fibre during the initial production process is being increasingly replaced by precisely calculated composite construction. This process needs more precision to be cost-effective. The more complex the structures get, the greater and more rapid the return on investment in LAP laser projection systems will be.



SHIPBUILDING

It is an art to design hulls, decks and components, which on one hand stand the forces of nature at sea and on the other hand don't act as unnecessary ballast. Here again lightweight design and precise construction are the key to success. LAP laser projection systems enable fast, precise and controllable placement of cut-outs, parts and modules. For you to ride the crest of a wave.



RACING

In Formula 1, hundredths of a second decide between victory and defeat. They are won by uncompromised optimization – on engines, tires, aerodynamics and weight. LAP laser systems are used in production of tires, engines and body parts. Not always in Formula 1, but you also want to move quick, safe and fuel-saving from A to B. Perhaps the carbon fibre parts of your motorbike are produced using LAP laser projectors, or your tires have been built with LAP SERVOLASER. Or the chassis clearance of your car has been adjusted with LAP laser sensors.



SPORT EQUIPMENT

Every bit of weight that has to be moved by muscular strength consumes energy. So it was only a question of time when composites, particular carbon composites, would be used in high end sport equipment. Featherweight bicycle frames, tear-resistant sails, stiff and virtually unbreakable wheel rims – everywhere you encounter special parts that could be produced using LAP laser projection systems. Or their production could be improved – even for prototypes and small batches.



AND NOW IT'S YOUR TURN

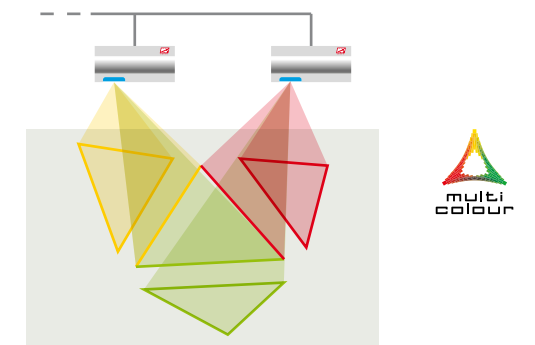
We haven't listed all applications, and we surely still don't know all possible uses for our laser systems. None of the examples rings a bell for you? So ask us. Perhaps you are the first in your business, and you can gain a competitive edge! (Or your competitor did so, and you wonder why you lose ground). Give us a description of your production task. If there is a solution for optimizing your production with our systems, we will find it and offer it to you.



One or several **clients** are connected to a **server**, where the projection data is allocated. Clients may start instances of the projection software and load the projection data.

LAP CAD-PRO laser projectors are installed above the working area. They can be mounted fixed at the ceiling or on beams or movable on swivel arms or rails.

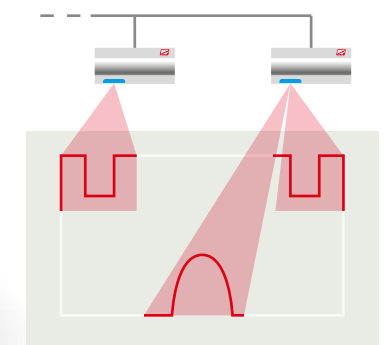
The projection shows the shape or unique profile segments true to scale at the specified position. The next part has to be placed exactly within the projected outline.



LAP MULTICOLOUR

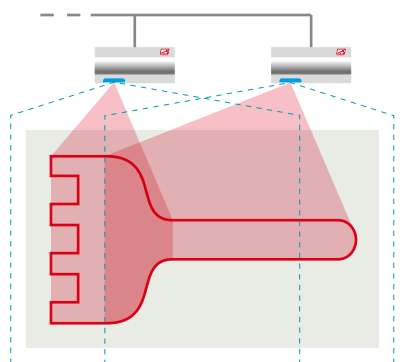
Outlines may be created and projected in three colours, by one or by several projectors. Change of colour is possible between or within shapes.

BENEFIT: Visual display of groups, remarks, status ...



VIEWPORT

One or several areas of the projection may be highlighted. The selection is done at the client screen by mouseover. **BENEFIT: Better visibility of important areas on request.**



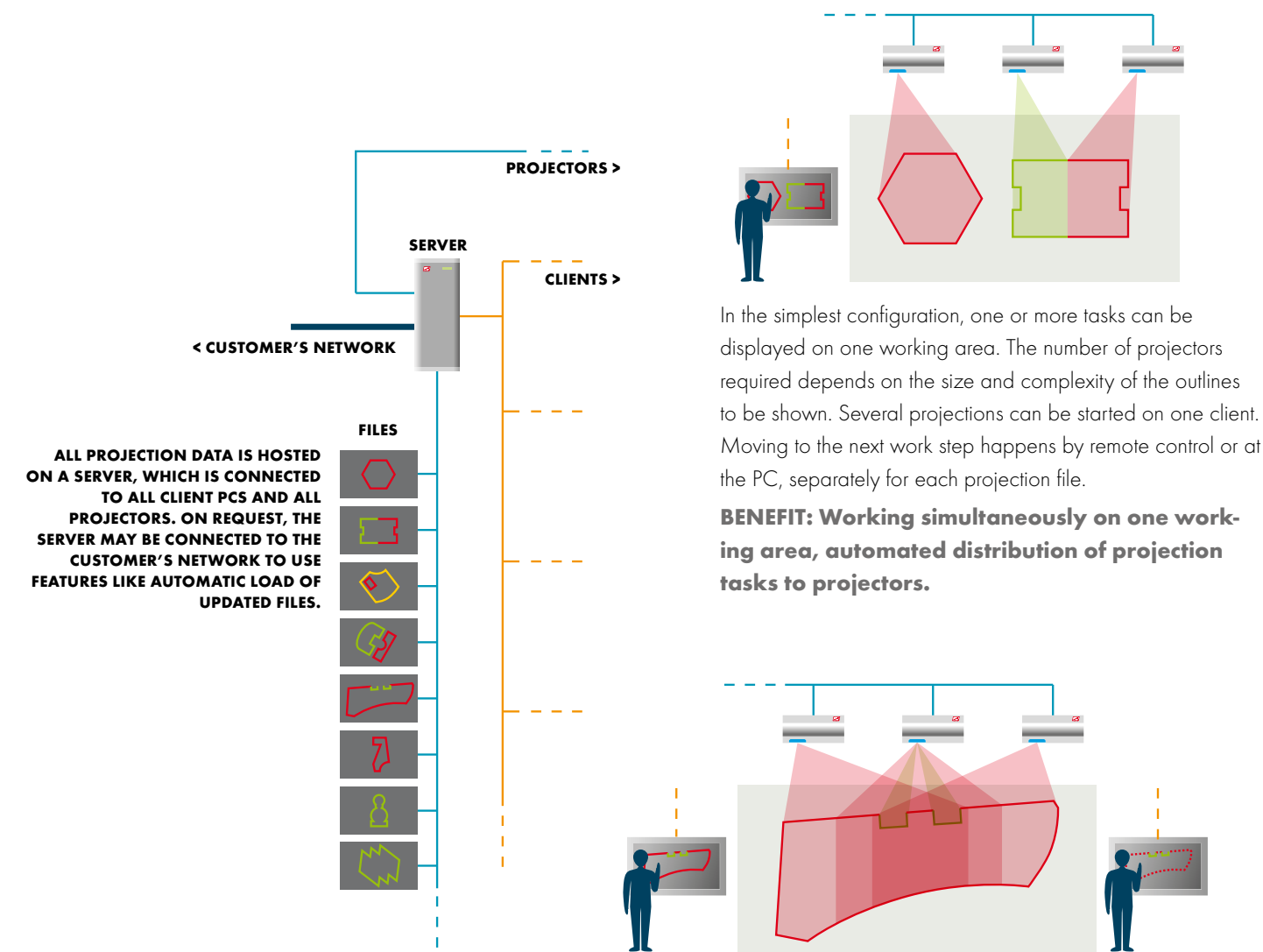
LOAD-BALANCING

Projection data is not distributed by position of the projectors, but by load. Projection areas have to overlap for optimal performance.

BENEFIT: Homogeneous, fastest possible projection.

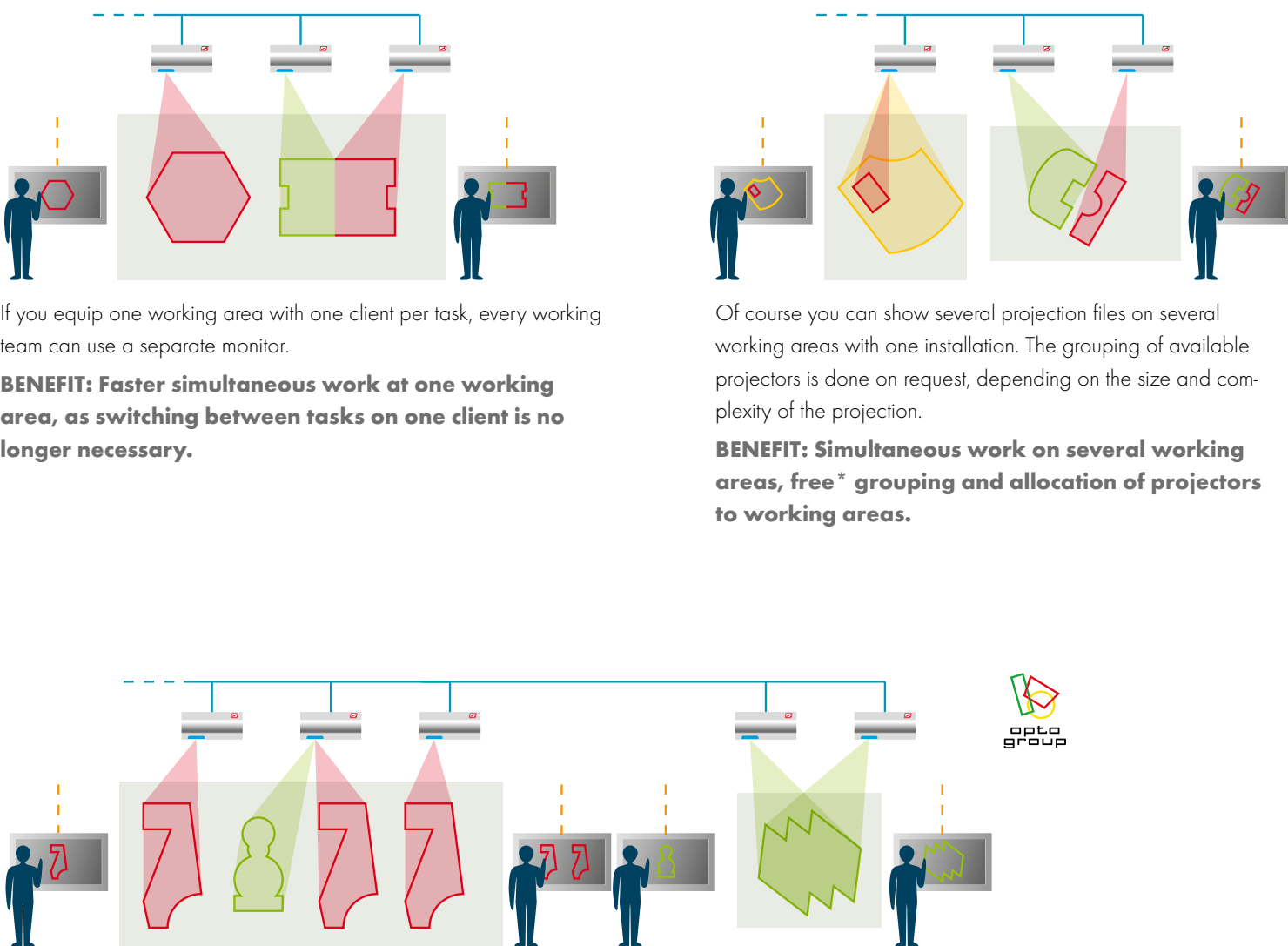


COMPOSITE PRO OFFERS MAXIMUM FLEXIBILITY BY USING A REAL CLIENT-SERVER STRUCTURE



Sometimes, e.g. on very large working areas, you may want to handle the same projection file with two or more clients at different locations and work steps. The LAP client-server concept copes with this task.

BENEFIT: Next PC in close reach, no unnecessary, time-consuming walking distances.



If the number of projectors and clients installed is sufficient, you can handle all configuration examples simultaneously:

- free * number of working areas
- one, several identical and/or several different tasks per working area
- Several tasks per client, one client per task or several clients per task

*The client-server structure supports virtually all combinations of installed projectors, tasks and work spaces. Needless to say, the work space for a task has to be within the range of the selected laser systems, and the chosen projector has to be calibrated with the calibration file belonging to the work space.

SERVER: Central computer that provides services and data to client computers.
CLIENT: Subordinate computer that uses services and data of a server.
WORKING AREA: Surface of a working table or a tool, e. g. a mould, where objects like pre-cut parts will be placed. The working area provides surveyed points, where reflecting targets may be fixed for calibrating the laser projectors.
TASK: (in this context) sequence of working steps, which require positioning of parts at or within a projected outline.
PROJECTION FILE: File containing the projection data of a task.
CALIBRATION FILE: File containing the coordinates of the reference points of a working area.



COMPOSITE PRO. SYSTEMATIC LASER PROJECTION.

Since 1984, LAP provides measurement and projection systems based on laser technology for different applications all over the world. Thousands of LAP laser systems prove themselves every day – most of the time in harsh industrial environments. The experience collected contributes to every LAP product and sets the foundation for the systems unparalleled reliability and precision. Complex installations in high-tech industries are day-to-day business for LAP.



THE USER INTERFACE

PRO-SOFT is used by mouse and keyboard, touch screen and/or remote control. Main tasks of the software are system calibration and the display of outlines in the order of the working steps provided in the projection file. On the display you may see the current working step as an outline or in different 3D views. Supporting functions are the management of users, orders and working data, from creation to archive. The whole production process may be documented consistently.

The user interface is designed for good usability and safe handling. The software may be used intuitively. Sophisticated features save time and make work easier.

Features:

- Compatible with all standard industry CAD data formats
- Visualisation of projection tasks top-view and 3D
- Display of working steps and their status
- Checking of working steps (Ply-Placement-Verification)
- Documentation and archiving of projects including working steps, status, checking procedures, timestamp, user ...
- User management
- Management of workgroups with flexible distribution of workspace, projection data and projectors (LAP Optogroup)
- Calibration dependent on situation (automatic, semi-automatic, manual)
- Fastest available automatic calibration on stationary worksites today
- Range of control elements can be used depending on complexity of task: Remote control for activities on work piece, touch screen for close-up tasks, keyboard and mouse for more complex functions



LAP Optogroup is the LAP client-server concept that allows projection tasks, working surfaces and groups of projectors to be more or less freely combined.



LAP Multicolour offers simultaneous projection in three colours. This may be used to visualize groups, show warnings or display information.



LAP Speedswitch describes the ability to change colours and/or outlines in real-time, with no noticeable latency.



THE PROJECTION SYSTEM

Laser projectors are the core of every **COMPOSITE PRO** system. They generate the laser beams and they project the outlines provided by the projection files. LAP projectors use the know-how of many successful laser systems for measurement and projection, which have been established in the market for years. Technologies, which have been effective by themselves, are now joined, modified and improved. Some of the results are the unbeatable digital control of the galvanometers, multicolour projection and the compact size. The projection path is calculated and the projection is executed in the projector in real-time. This way, there is no noticeable latency at changes of colour and/or shape (LAP Speedswitch) as often found with systems doing the curve calculation on the PC. LAP laser projectors are designed for durability and high life expectancy in industrial environments. Hardware in server and clients is also selected to meet industrial requirements.

Features:

- Digital control with high-end algorithms
- Simultaneous projection in three colours (LAP Multicolour)
- Focussing by remote control
- Change of shape and colour without annoying latencies (LAP Speedswitch)
- Compact and lightweight design in spite of separate areas for projection (sealed) and cooling (supply of ambient air)
- Swivel mount with click-lock for fast and easy installation

THE SERVICE

LAP supports you before, during and after the installation of an LAP system. Tens of years of international experience with installation and maintenance of laser systems across virtually all industries make LAP a reliable and competent partner.

Before you decide, we offer intense consulting. We show you the advantages of our technology as well as its limits. We give advice during site planning and install the system on site. After commissioning, we accompany your first steps until you reach full performance.

Every customer has different requirements concerning maintenance intervals, response time and protection against downtime. Consequently, LAP offers every customer an individually tailored package, which may exceed normal performance by far.

You need on-site replacement? 24/7 emergency service? 24h-hotline? Or is replacement within 24 hours, working day service and periodical training of your employees enough? Tell us your wishes – we will find a solution that is sufficient for your needs.



TECHNICAL DATA LASER PROJECTOR

Lasertype, wavelength, LAP Multicolour	red: diode, 635 nm green: DPSS (solid state), 532 nm yellow: combined projection of red and green
Accuracy */**	± 0.06 mm/m
Repeatability */**	± 0.025 mm/m
Beam width **	0.5 mm FWHM
Max. projection angle	80°
Laser power	starting from 5 mW
Laser class	2M (3R, 3B)
Enclosure rating	IP 54
Ambient conditions	0–40 °C, 35–85 % rel. humidity, non-condensing
Power supply	24 VDC, max. 1 A
Connection	RS 485, Ethernet by interface
Dimensions (L x W x H)	300 × 110 × 110 mm
Weight	ca. 3 kg

* mm per m distance projector to surface.

** within ± 30° projection area in 4 m distance, beam impact perpendicular to surface, optimal focusing and calibration, > 30 minutes warm-up time.



Customizing

- Support during site planning
- Supply of additional equipment (Mounting accessories, rails, beams ...)
- Software customizing and add-ons (connection to customer network, barcode handling ...)

Installation and commissioning

Training

Maintenance

- Substitution units for provisional use during maintenance
- Exchange of parts subject to regular wear and tear
- Cleaning
- Adjustment

Updates for software and firmware

Repairs

**THERE'S MORE TO IT THAN THAT.
LAP ALSO OFFERS NON-CONTACT
LASER SYSTEMS FOR
DIMENSIONAL MEASUREMENT.**



www.LAP-LASER.com

COMPOSITE PRO, HIGH-TECH QUALITY BY LAP

For more than 30 years, LAP has been developing, manufacturing and distributing laser measurement systems, line lasers and laser template projectors for industrial and medical applications. LAP products are high-precision devices **Made in Germany**.

Using LAP laser systems, our customers improve performance and increase the quality of their products as well as the effectiveness of their processes.

As a result of continuous product innovation, LAP has become a world leader in lasers for projection and measurement. LAP products are setting the standards in a wide range of markets from manufacturing to heavy industrial environments and medical applications. Environmental protection is important to us. We use solar panels, green electricity and roofs planted with grass. Our production is planned by standards of sustainability.

Quality has always been part of our commitment. We are content if you are. We know your high demands. To meet your requirements, the quality management of LAP is certified by DIN EN ISO 9001:2008 for industrial products and by EN ISO 13485:2007 for medical engineering products.

www.lap-laser.com/COMPOSITE



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