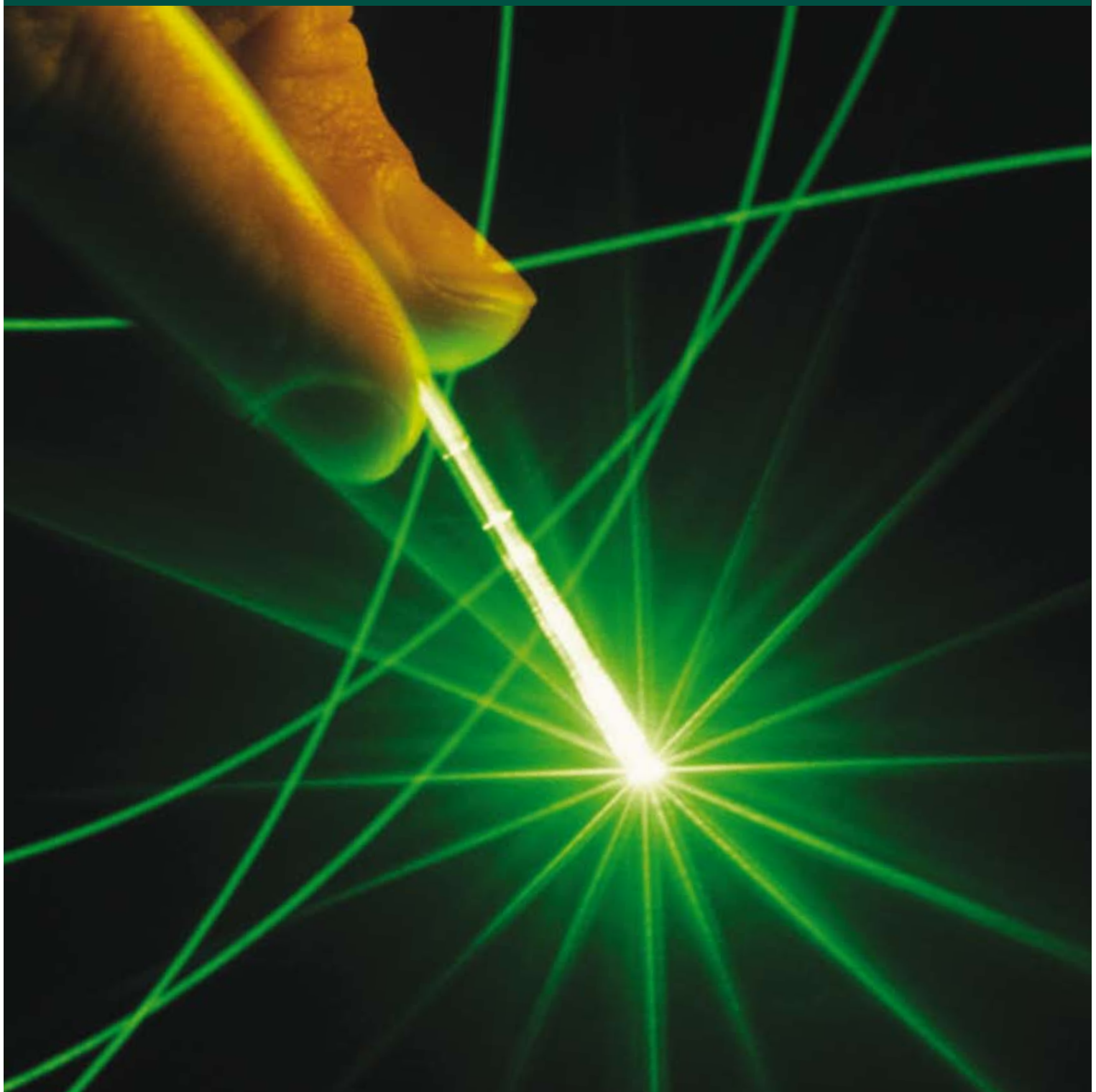


Medical Photonics

Using new technologies in innovative
product development

SAGENTIA



We have a proven track record in photonics-based medical product development. We offer a combination of technical expertise and specialist knowledge of medical product design, backed by a comprehensive in-house product development capability, which enables us to deliver competitive, innovative new products within challenging timescales.

Surgical lasers

In the 1990s, we recognised the potential of newly emerging infrared diode laser technology for ophthalmic surgery, but we were also aware of the limitations resulting from the relatively low power levels available. By exploiting our knowledge of the physics of laser diode operation, we developed a product which delivered the higher power levels required and offered excellent reliability. We formed a close working relationship with a laser diode manufacturer which resulted in the swift development of the visible (red) laser diodes required to aim the infrared therapeutic beam. The resulting product became the world's first portable, solid-state ophthalmic surgical laser.

Blood analysis

We have developed a novel, patented optical technique for non-invasive blood analyte monitoring, based on the Doppler effect. The technique solved a fundamental problem in blood monitoring – that of extracting blood-related data from an optical signal which also contains information on tissue, bone and fat.

Our technique is based on the effect moving blood has on light – the resulting frequency shift allows the monitor to isolate blood data and ignore everything else.

High power solid-state lasers

High-powered surgical lasers are relatively large and expensive, often needing a gas supply and a water-cooling system. In order to deliver the same power using compact, low-cost, solid-state laser diodes, we invented an innovative optical system that delivered an output of over 50W from a single 100µm core optical fibre. The technology was subsequently successfully commercialised by spin-out company Diomed, now headquartered in Andover MA.

Auto-focusing for neuro-surgery

Complex neuro-surgery often requires the use of relatively high-magnification surgical microscopes, but the resulting small depth of field leads to frequent manual re-focusing and a consequent increase in surgery time. We have developed a cost-effective auto-focusing system that adjusts the image in response to shifts in

the surgeon's gaze. The system projects a pattern of infrared light (generated by low-cost LEDs) onto the surgeon's eyes. A video image of the reflection is then analysed to determine the surgeon's gaze, and the microscope focus is adjusted accordingly.

www.sagentia.com
info@sagentia.com



Sagentia Ltd
Harston Mill
Harston
Cambridge
CB22 7GG
UK

T. +44 1223 875200

Sagentia GmbH
Westend Carree
Grüneburgweg 18
D-60322 Frankfurt
Germany

T. +49 69 9550 4500

Sagentia Inc
8161 Maple Lawn Boulevard
Suite 475
Fulton, MD 20759
USA

T. +1 240 547 6600

Sagentia SGAJ Ltd
Unit 6-7, 13/F
Wah Wai Industrial Centre
38-40 Au Pui Wan Street
Fotan
Hong Kong

T. +852 2866 8701

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