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## Deal Radar 2010: OmniGuide

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[OmniGuide, Inc](#) <sup>[1]</sup> develops and commercializes high-precision, flexible, minimally invasive surgical instruments. OmniGuide's family of indication-targeted fiber-optic scalpels enable flexible delivery of clinically beneficial CO2 laser energy, thereby broadening the field of minimally invasive surgery.

Based on the photonic band gap fiber invented at MIT, published in *Nature* and *Science*, and subsequently licensed exclusively to OmniGuide for all applications, the company created the first flexible fiber-optic surgical scalpel capable of delivering CO2 laser energy. For more than 30 years, CO2 lasers have offered surgeons a very high degree of precision cutting capability. But the lack of a fiber delivery system, stemming from the absence of known transparent materials at the relevant wavelength, limited the lasers' use to "line-of-sight" surgical procedures where CO2 laser is energy delivered through a periscope — a large, cumbersome arrangement of mirrors and arms that fired only in a straight line. OmniGuide has solved the problem of guiding CO2 laser light by using a photonic band gap mirror lining, which enables light to be guided through a hollow core. This circumvents the impairments of solid fibers such as energy loss and wavelength and power limitations.

In 1998, graduate students Yoel Fink (who later became a professor at MIT), Joshua Winn, and Shanhui Fan (advised by Professors John Joannopoulos and Edwin Thomas), discovered a new type of planar reflector that allowed them to combine the best features of all known mirrors and achieved "omnidirectional reflectivity": the perfect mirror. Further work on an omnidirectional mirror in fiber form by Fink and his graduate students Shandon Hart and Garry Maskaly opened the path for large-scale production, and eventually towards commercialization.

Yoel Fink's association with OmniGuide is as the inventor. He subsequently took on the role of guiding the technology development process while establishing the company as a separate enterprise. Over the years that followed, he took a leave of absence from MIT and became the company's full-time CEO. He has guided the organization through the commercialization process.

Through a direct sales force in the United States and distributor-based sales forces in Europe, OmniGuide targets surgeons in the fields of neurosurgery, otology (the branch of medicine concerned with the ear), head and neck oncology, and laryngology. OmniGuide says that this market represents a \$2.5 billion opportunity in total.

OmniGuide launched its first products in late 2006. Revenues quadrupled in 2008, and the company expects to more than double them in 2009 and to achieve profitability within the next six months. Major customers include Albany Medical Center, Boston Medical Center, Yale New Haven Hospital, the Mayo Clinic in Arizona, and Tampa General Hospital, among other institutions. Initial penetration was driven by collaboration with thought leaders in larger teaching hospitals. This allowed OmniGuide to get the product to a set of users who understood the technology not for what it was, but what it could be. Initially, the challenge was as much internal as external since there was no roadmap that OmniGuide could follow to meet its goal: to draw 20 micron-thick bi-layers of glass and polymer into a fiber with less than 5 percent error tolerance.

The initial competition was line-of-sight CO2 laser systems, which were still in regular use for head and neck cancers, and treatment of airway disease (diseases where the target could be visualized directly). OmniGuide launched in this segment in September 2006, working with users already familiar with CO2 laser technology. CO2 is very well absorbed in water compared

to other lasers and cautery-based tools, which makes it more precise when dealing with soft tissue and causes less thermal damage to surrounding healthy tissues and critical structures such as nerves and blood vessels. In this segment, where competitors include [SSI Laser Engineering](#) <sup>[2]</sup>, OmniGuide positions its laser as being more flexible and allowing for greater ease of access. The company then expanded to ear surgery in September 2007, where the competitive space expanded to include other lasers (such as Argon and KTP) and mechanical instruments (drills and scalpels). Competitor [PEAK Surgical](#) <sup>[3]</sup> makes a family of cutting instruments for soft tissue based on radiofrequency technology that are also used in ENT (ear, nose and throat) surgery, as well as neurological, spinal, and general surgery. Most recently, with the September 2008 launch in neurosurgery, the competitive space extended to bipolar electrocautery (burning tissue to control bleeding), where a competitor is [Valleylab](#) <sup>[4]</sup>, and ultrasonic cavitation.

OmniGuide has received approximately \$75 million in financing from seed investors and venture investors since its inception, including five rounds of equity financing, most recently \$25 million from a group of venture capital investors in May 2008 with a follow-on round of \$1.8 million in May 2009. The biggest investors include Psilos Group, Stata Venture Partners, Argonaut and Electro Scientific Industries (ESI). There are currently no plans for additional equity financing.

OmniGuide plans to grow its business by increasing penetration in existing markets, product launches into new verticals, and further expansion into new geographical areas such as Europe and Asia through distribution partners. It will consider all exit options, including public equity markets and corporate partnerships.



**This segment is part 2 in a running series**

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[2] SSI Laser Engineering: [http://www.ssilaserengineering.com/faq\\_co2\\_laser.html](http://www.ssilaserengineering.com/faq_co2_laser.html)

[3] PEAK Surgical: <http://www.peaksurgical.com/>

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