



A case study in converting academic research to a
venture-funded technology startup in Oregon

Outline

- The problem
- The research
- The market
- The solution
- The deal
- The company
- The investor profile
- The takeaways

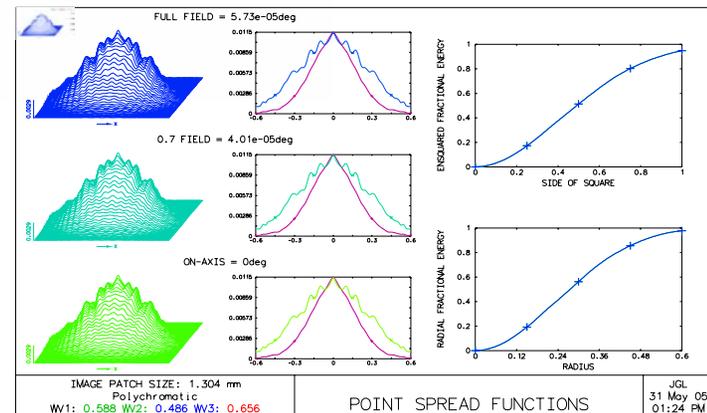
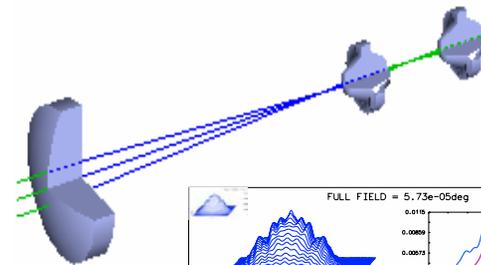
The Problem

- *Solid-state laser technology hit a brick wall*
 - *Non-linear optical materials could go no further in wavelength or power advancement for solid state lasers*
 - *Unreliable performance*
 - *Expensive*
 - Solid-state CW~\$65k/100mW
 - Solid-state pulsed~\$65k/W
 - *Solid-state laser roadmap ended at 266nm*
- *Result – significant market pull for a solution*



The Research

- Fundamental materials advancement in non-linear optical crystal carried out by the OSU Chemistry Department under Dr. Douglas Keszler.
- New material enables solid-state lasers at deep ultra-violet wavelengths and power levels never achieved before



The Market

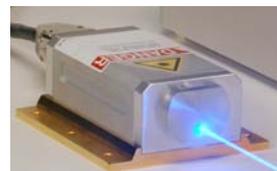
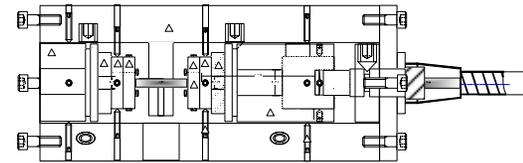
- All OEM industrial applications for solid-state deep-UV lasers
 - \$500M market in 2005
 - >19% CAGR to 2008
- Initial target applications
 - Patterned Wafer Inspection
 - 30nm defects at 65nm node
 - 1000 units per year
 - Nano Machining
 - 200nm features
 - 400 units per year
 - Nanometrology
 - <10nm Scatterometry on thin films
 - 600 units per year



Pictures courtesy of ESI and KLA-Tencor

The Solution

- *A long-life, high power, solid state Deep-UV fiber laser*
 - Low Cost
 - Superior Performance
 - 30,000 Hour Lifetime
 - No heat at work site
 - Roadmap to 193nm and 100W
- *Disruptive, defensible IP*
 - Exclusive rights to OSU material IP
 - Deep Photonics laser IP



The Deal

- Objective
 - Dominate the deep ultra-violet laser market with a novel laser system based on disruptive NLO material, fiber laser technology and frequency conversion IP
- The deal makers
 - OSU Department of Science – Sherm Bloomer
 - OSU Tech Transfer Office – Craig Sheward
 - OSU Foundation – Maya Abels
 - Enterprise Law Group, Menlo Park CA
- The money deal
 - \$750k seed financing
 - IP protection
 - NLO material production development
 - Laser IP development
 - Prototype demonstration
 - 20% discount for seed investors at Series A
 - \$1.8M Series A Financing
 - Customer order trigger
 - \$35M post money valuation
 - Cash flow positive Q106



The Company

- Located in Corvallis, Oregon
- Incorporated in Delaware Q104
- Engineered management team
 - Experienced tech startup entrepreneurs (2)
 - Best-of-breed technical staff (4 PhDs)
- Seven employees
- \$2.5M startup capital raised
- IP Position
 - Materials technology
 - Laser technology
 - Six patents in process
- Outside BOD members :
 - Dr. David Lam, founder and former CEO of LAM Research
 - DK Kim, Chairman Daehong Corp, Korea
 - Bruce Juhola, former CEO of Microbar
- Counsel
 - Business – Enterprise Law Group, Menlo Park CA
 - IP – Townsend and Townsend, Palo Alto CA



The Investor Profile

- The financial investor
 - Marginal market opportunity (\$1B preferred)
 - Uncomfortable without control
 - Allergic to seed financing w/o valuation
 - Expensive money in early stage financing
 - Best fit for later stage (low technical, financial risk)
- The strategic investor
 - Customer with technology pain
 - Higher risk threshold
 - Revenue drives valuation
 - Leverage market position
 - Exclusivity in niche
- The value-added investor
 - Leverage intangibles
 - Distribution rights
 - Exclusivity in new markets
 - Complimentary technology
 - Our best source of seed money
- Deep Photonics funding strategy
 - Value-added investor for seed financing
 - Strategic investor to drive valuation
 - Financial investor for market and production expansion



Takeaways

- Problem-driven research is the genesis of tech-driven jobs
- Disruptive technology is initially faith-based; match the best and brightest (i.e. PhD's) with the executioners (entrepreneurs) to get the dream team
- Do not compromise on business or IP legal talent; go with track record on this one
- Management needs skin in the game, not just the investors
- Always take the value-added investor early, if you can get it
- Sell intangibles before equity
- Get strategic investors to drive valuation
- Use expensive money last
- Target the low hanging fruit and FOCUS