

Smoothing the Path for International Alliances

IRG Meeting

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David Kolczynski

Director of Operations

QED Technologies

1040 University Ave.

Rochester, NY 14607

(585) 256-6540

kolczynski@qedmrf.com

www.qedmrf.com

Agenda

- Brief history of QED Technologies
- QED's Business Strategy
- Forming an International Alliance
- Managing the Alliance
- Questions & Answers

Brief History of QED Technologies



- 1993 Research on using magnetorheological fluids to polish optics began at Center for Optics Manufacturing.
- 1996 QED Technologies was founded to develop commercial MRF systems for precision optics market
- 1998 First MRF systems shipped to customers.
- 2002 QED 4th fastest growing private company in Rochester, Introduces first metrology product.
- 2004 100th machine installed worldwide.
- 2005 45 employees with offices in Rochester, Australia, Japan and Europe.

How precise are precision optics?

Tolerance	Metals (typical)	Optics (typical)
Geometry	25000 – 2500nm (0.001 – 0.0001")	300 - 30 nm

nm = nanometer (10^{-9} meters)

Human Hair



75,000 nm

Eyeglass Lens



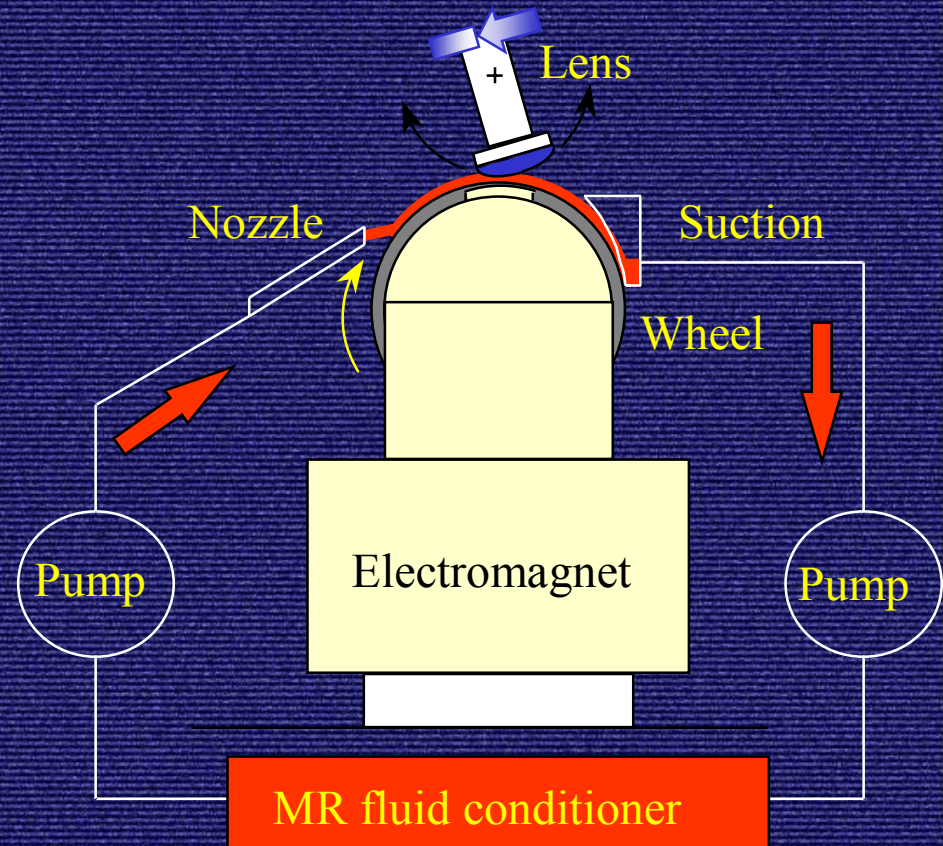
Accuracy - 40,000 nm

Photolithography Lens



Accuracy - 6 nm

MRF process schematic



QED Product Line



- **Q22-XE** – Up to 80 mm in diameter.
- **Q22-X** – Up to 200 mm in diameter.
- **Q22-Y** – Q22-X + Raster tool path.
- **Q22-400X** – Up to 400 mm in diameter.
- **Q22-750P2** – Plano optics up to 750 mm x 1000 mm in size.

- The next-generation, meter-class machine is being built to finish free-form optics
 - **Q22-950F** – Meter class freeform optics
 - **Q22-xxxxF** – Multi-meters (up to 4 m) freeform optics

- **SSI** – Sub-aperture Stitching Interferometer (SSI) for high precision metrology.

Business Strategy



- QED Technologies was founded to commercialize an innovative technology for polishing precision optics
 - Business strategy was to stick to the company's core competencies and outsource everything else.
 - For QED, that means having a core team of software developers, optical engineers, fluids and mechanical engineers, designers, applications engineers, R&D, and service staff.
 - QED decided not to build our machines
 - Build assemblies that handle MR fluid
 - Manufacture MR fluids

Business Strategy

- Worked with a CNC machine manufacturer in Boston area to design and build initial machines – QED owned design.
- Began discussions about collaboration with a potential competitor in 1999
 - Company interested in developing a product that would be synergistic with QED's machines
 - Company designed and built CNC machines for precision optics market
 - Company also offered potential distribution and service support in Europe

Business Strategy



- Relationship with machine builder in Boston was declining
- Decision made to partner with German company
 - Company would design & build QED's machines
 - Company would distribute and service QED's products in Europe
 - QED would distribute and service a subset of their products in US
- Signed Alliance Agreement in late 2000

Forming an International Alliance

- Key Steps
 - Define & agree upon main points at executive level
 - Conduct due diligence of potential partner
 - Create detailed alliance agreement document
 - Utilize external resources
- Allow sufficient time for this process

Forming an International Alliance

- Define & agree upon main points at executive level
 - Draft and sign initial agreement
 - Identify critical points for your company
 - Work to build trust
 - Structure for win-win scenario

Forming an International Alliance

- Conduct due diligence of potential partner
 - Review company's financial position
 - Audit company's business processes
 - Assess technical ability
 - Understand company's history and strategy for the future

Forming an International Alliance

- Create detailed alliance agreement document
 - Identify top issues for your company
 - Intellectual property
 - Pricing/commission policies
 - Design ownership
 - Establish metrics/expectations for the alliance
 - Cost reduction targets
 - Sales quotas
 - Document consequences

Forming an International Alliance

- Create detailed alliance agreement document
 - Understand what you are willing to negotiate and what you will not
 - Address potential scenarios
 - Changes to relationship
 - Disagreements
 - Be thorough - document should be as comprehensive as possible
 - Avoid assumptions – record all expectations, regardless of how minor

Forming an International Alliance

- Utilize external resources
 - Lawyers
 - Company Advisors/Directors
 - Consultants
 - Translators
 - Developing alliance agreement
 - Protecting interests
 - Ensure nothing is overlooked

Managing The Alliance

- Key Steps
 - Clearly define roles & responsibilities
 - Establish formal lines of communication
 - Appoint an Alliance Manager
 - Jointly develop business processes
 - Conduct annual executive meeting to review the alliance
 - Acknowledge & address cultural differences

Managing The Alliance

- Clearly define roles & responsibilities
 - Share organizational charts
 - Clarify ownership of issues
 - Identify back-ups for key resources
 - Define escalation process for issues

Managing The Alliance

- Establish formal lines of communication
 - Schedule regular meetings
 - Phone/video conferencing
 - Face-to-face
 - Require & distribute meeting minutes
 - Define frequency of reports
 - Address time differences
 - Off-hour communication
 - Promote communication at all levels

Managing The Alliance

- Appoint an Alliance Manager
 - Position must be created in both companies
 - Manages changes in the relationship
 - Drives activity within respective organizations
 - Resource for resolving issues
 - Individual must have sufficient power within their respective organization

Managing The Alliance

- Jointly develop business processes
 - Address areas where sufficient structure does not exist
 - May need to educate partner
 - Ensure critical areas are clearly understood
 - Document control
 - Design control
 - Product development
 - Sales & service

Managing The Alliance

- Conduct annual executive level meeting to review the alliance
 - Review metrics
 - Review critical areas of agreement
 - Identify and address problem areas
 - Discuss potential changes to the agreement
 - Ensure that agreement is renewed on time
 - Assess balance of alliance – still win-win?

Managing the Alliance

- Acknowledge and address cultural differences
 - Communication challenges
 - Differences between email, phone and face-to-face communication
 - Interpretations of words/sayings/slang
 - Added cost and time for document translation
 - Work practices/schedules
 - Responsiveness/Sense of Urgency
 - Holidays
 - Consider cultural training early in the relationship

Summary

- Keys to success
 - Have clear expectations of the alliance
 - Conduct due diligence of potential partner
 - Maintain win-win mentality
 - Acknowledge and address cultural differences
 - Appoint Alliance Managers
 - Regular reviews at executive level

Questions?

Thank you!