

Company Overview

LightPath is a recognized leader in optical solutions for industrial, defense, communications, test and measurement, and medical applications. For over 20 years, LightPath has built a strong portfolio of optical components and technologies that serve these industries. These products include molded glass aspheric lenses, optical isolators, fused fiber collimators, and gradient index GRADIUM® lenses.

LightPath began in 1985 with the invention of GRADIUM® glass, an axial gradient index glass that is used to make high performance, cost effective lenses for high power laser systems. As this breakthrough technology gained greater market acceptance in industrial applications, Lightpath grew from just a few employees to well over 100.

In 1996, LightPath completed its initial public offering (IPO) and joined the NASDAQ (symbol: LPTH). In 2000, Lightpath leveraged these new resources to acquire two new companies, Geltech, Inc. and Horizon Photonics. Geltech added the capability to mold high quality glass aspheric lenses and Horizon Photonics brought a product line of optical isolators as well as expertise in automation. LightPath combined these new capabilities with its own technologies, bringing a wealth of expertise to solving complex optical problems for the entire optics industry.

Our customer base is very diverse with applications that include laser welding & cutting, military laser tag, data communications, bar code scanning, particle measurement, medical endoscopes, telecom multiplexers, and many other optical application areas. We pride ourselves on high performance, customer support, quality products, value added designs and cost effective volume manufacturing.

Facilities

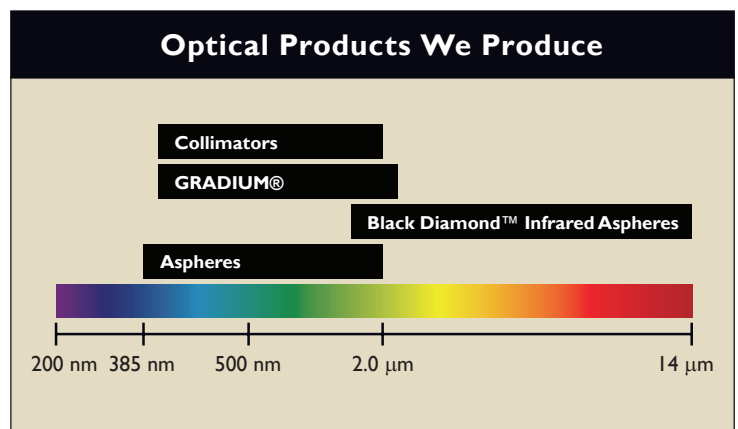
LightPath currently operates two facilities, our Corporate Headquarters based in the Research Park at the University of Central Florida in Orlando, Florida and a high volume production facility located in Shanghai, China.



Our Corporate Headquarters in Orlando has 22,000 square feet (2,044 m²) of space including 8,000 square feet (743 m²) of class 10,000 production floor for automated manufacturing. LightPath's facility also maintains a class 100 clean room for high performance projects, a precision machine shop with single point diamond turning capabilities for quick turn prototypes and complete metrology labs.



Our second manufacturing facility in Shanghai, China has 17,000 square feet (1,580 m²) and over 5,000 square feet (465 m²) of clean room. LightPath's Shanghai facility is wholly owned and is fully integrated into LightPath's production and quality inspection programs.



The products we produce include a wide spectrum of molded glass aspheric optics ranging in size from 0.25 mm to 25 mm. GRADIUM® lenses, which give the performance of an asphere, are available between 5 mm and 100 mm. LightPath also offers a full range of optical isolators for communications applications.

LightPath also offers the ability to combine optical elements into a complete assembly, providing full engineering support for both optics and mechanics. LightPath uses an integrated approach; our optical and mechanical engineers work directly with our customers on their optical system requirements. This enables the finished application to obtain the highest level of optical integration, minimizing time, size and cost while ensuring quality, performance and manufacturability. With LightPath's automation capabilities, when your product is ready for full production we are ready to take you there.

LightPath Quality

At LightPath Technologies, we work very hard to make quality and customer satisfaction our top priorities. Our product quality is our first priority for our customers. We value your business, and it is our goal to provide competitively priced, top quality products that satisfy our customer's technical and time to market requirements.

LightPath's incoming and final inspection groups are comprised of experienced personnel with an average experience of over five years per inspector. A range of environmental chambers are available in-house and used for reliability testing for Telcordia and other MIL standards in order to meet product qualification requirements. LightPath is an ISO 9001 certified supplier.





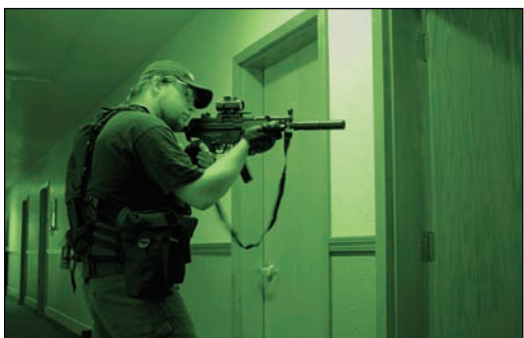
Industrial

Many of the world's top automobile manufacturers use LightPath's GRADIUM® lenses and lens systems to focus their Nd: YAG lasers or fiber lasers for automated welding and cutting operations. Molded glass aspheres are used by the major shippers worldwide in barcode scanning and package handling systems. The top computer-to-print manufacturers use our aspheric molded optics for unmatched performance.



Medical

When optimal performance is paramount, glass aspherical lenses are used for medical imaging systems and procedures requiring laser cutting and healing. GRADIUM® lenses and molded glass aspheres are found in many analytical instruments measuring different body functions in both the operating room and the lab. LightPath also provides lenses to the world's top manufacturers of endoscopes, providing a very wide field of view in a very small lens. We work with many companies in biotechnology developing new optics and optical systems in the fields of genetics, DNA, and protein analysis.



Defense & Government

Over the last 10 years, LightPath has provided large volumes of lenses to defense contractors for many simulation training programs, which train our armed forces using lasers instead of bullets. Smart bombs and munitions utilize aspheres for communication and distance measurement. Under a development contract with the U.S. government, LightPath developed radiation hardened aspheres that are currently being used for satellite communication in both the military and commercial market. Specialty glass optical systems have also been developed for eye and instrument protection against damaging laser beams.



Communications

LightPath products have been developed for a variety of communications applications in both Telecom and Datacom. Our lenses, collimators and isolators are used to maximize light efficiency while minimizing both size and cost. Applications including mux/demux, switching and routing, amplification, dispersion compensation, sensing, transmitters, receivers and transponders all require the products and performance LightPath provides to move the light on and off the fiber.



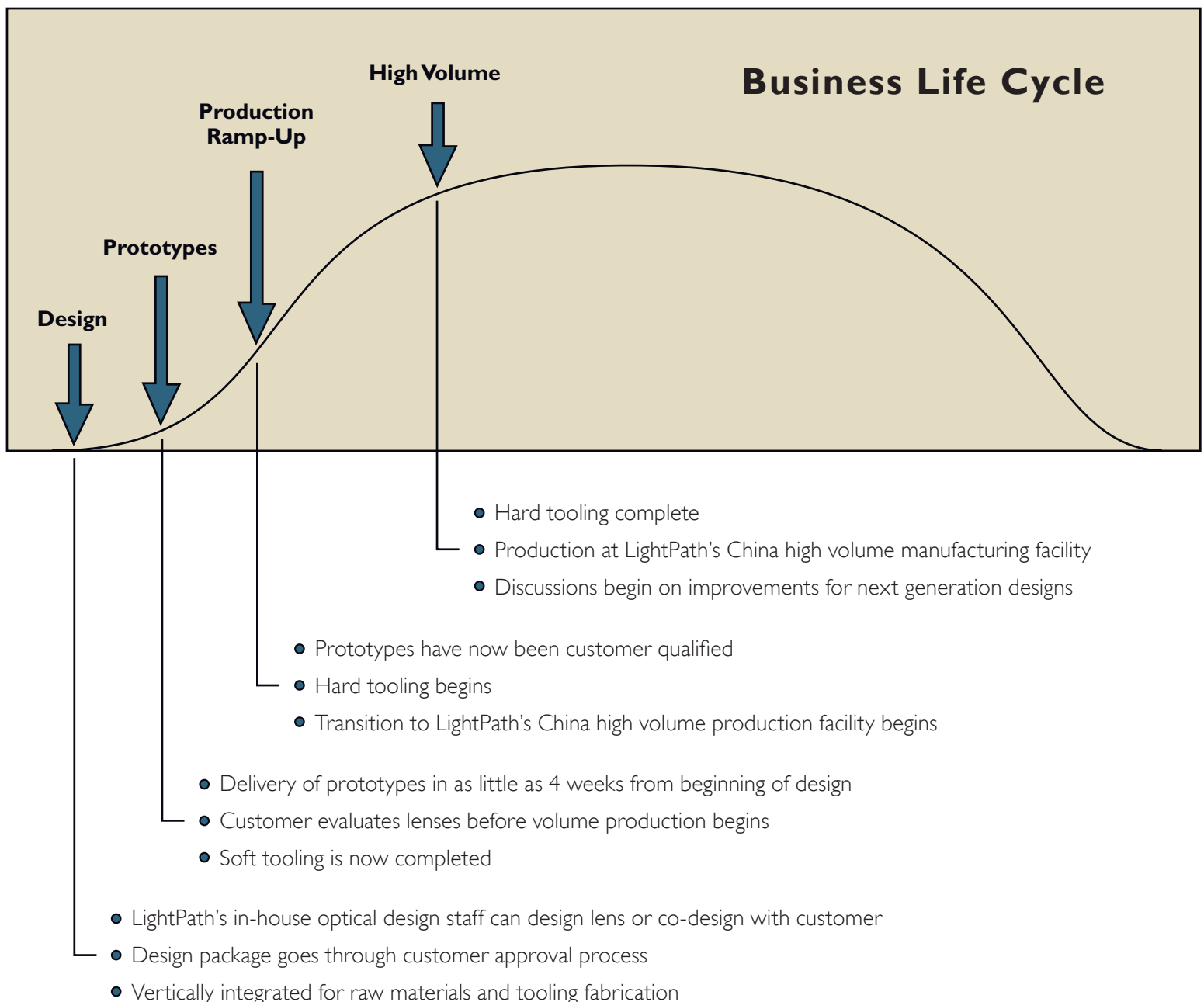
Metrology & Instrumentation

LightPath's optical components are employed in a variety of optical measurement systems and optical sensors including applications ranging from simple laser levels to highly complex spectroscopic sensors. Instrumentation manufacturers utilize LightPath's custom molding capabilities to produce optimized lenses or choose an appropriate product from our catalog's large lens selection. LightPath's integrated solutions provide compact sub-assemblies with a reduced number of optical components and lower cost to manufacturers that prefer not to handle optical components.

LightPath's Capabilities

Most optical systems require specifically designed optical elements to achieve optimum performance. LightPath is committed to manufacturing optical components that are designed to be the perfect fit for your specific application. LightPath has developed an in-house capability to quickly design, engineer and manufacture custom optical components to your individual specifications.

Custom design and manufacturing begins with the customer's basic requirements. LightPath's custom design team will work with our customers and their specifications in order to produce a product that meets the requirements and is cost effective to manufacture.



LightPath's unique capabilities allow for a partnership through the entire business life cycle of your product. LightPath provides quick turn around on the initial design and prototypes. As volume grows, LightPath can help transition your optics from the design and prototyping stages through the ramp-up to full high volume production.

- Complete opto-mechanical design services
- Engineered to your requirements
- Prototype to full manufacturing capability
- Full NIST traceable test and metrology
- Commercial optical sub-assemblies
- Defense optical systems
- ITAR Compliant

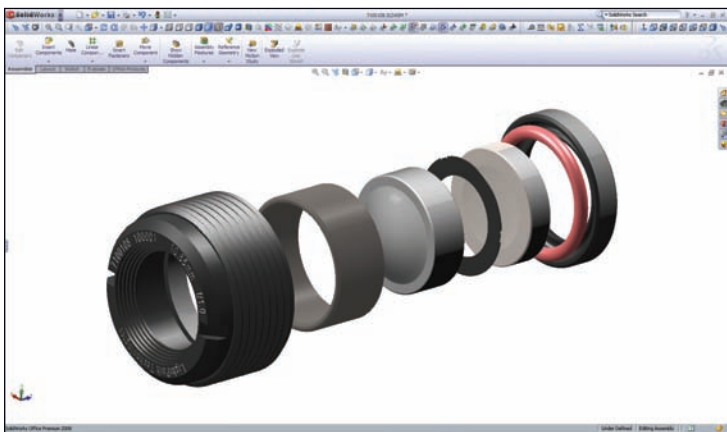
Opto-Mechanical Design

By utilizing more than 20 years of optical component design and manufacturing experience, LightPath can provide you with a complete optical solution. Understanding what it takes to build components and understanding manufacturing tolerances can make the difference between success and failure. LightPath provides a team of product specialists, optical design engineers and production engineers to review your requirements and provide feedback on how to most effectively manufacture your lenses. This process will help us understand your requirements and provide you with the most cost effective, high performance solution.

Utilizing our in-house source of innovative products such as molded glass aspherics, infrared aspherics, GRADIUM® optics, and patented fiber fusion, you no longer have to worry about searching to find solutions. If your design calls for cost effective aspheric elements, we can manufacture them in-house and typically in half the time it takes elsewhere.

Our engineers work with state of the art optical and mechanical tools, such as Zemax®, Oslo®, Code V®, and ASAP® for optical design, modeling and simulation. Mechanical and complex thermal analysis is done with SolidWorks®, Pro/Engineer®, and COSMOS®. Other simulations, such as diffractive and stray light analysis, can be performed and data provided to the customer throughout the design phase of a custom component or assembly.

From start to finish LightPath provides you with the required expertise to produce the highest quality optical components!



“When it comes to designing optical systems, it takes more than a computer to make it right.”

Vertically Integrated Design & Manufacturing

LightPath's vertically integrated engineering staff and two production facilities allow us to quickly design and manufacture all required production tooling and enables quick turn prototype optical components.

LightPath's lens molding equipment is designed and developed by our own engineers to provide a flexible, highly scalable press molding technology that complements our in-house diamond turning machines for high quality mold production. We also have invested in significant machining equipment for fast production of metal lens holders and similar machined parts. Finally, all products are fully inspected to meet LightPath's quality standards.

Volume Manufacturing

LightPath's manufacturing facilities are able to grow with your production requirements. Prototypes and low volume production quantities are quickly produced with low-cost, soft mold tooling. At higher volumes, hard tooling is used to provide longer lifetime molds for cost effective production.

LightPath's two facilities allow for flexible scheduling of your production needs. Fast turn around and ITAR compliant projects are performed at our Orlando facility. Higher volume projects are run at LightPath's wholly owned facility in China for maximum cost reduction while maintaining LightPath's high quality standards.

ITAR Compliance

LightPath is fully equipped to handle ITAR compliant projects. Our Engineering and Production Facility in Orlando is ITAR registered and routinely handles ITAR restricted projects. Contact us for more information about ITAR projects.

ITAR DTC Code 090617976

Contact LightPath today to discuss how we can help you with your application.

Geltech® Aspheric Lenses

For aspheric lenses, we can complete new designs and provide prototypes in a matter of weeks while keeping development costs among the lowest in the industry.

LightPath has developed a fully qualified molded glass catalog that covers most design needs. The glasses in our standard catalog have been fully qualified with our process and will provide the most cost effective lenses and enable the fastest turnaround times. AR coatings for these glasses have also been designed, tested and qualified. Our standard glass catalog includes:

- **D-ZK3** - high volume **RoHS** ✓ compliant glass
- **D-ZLaF52LA** - higher index **RoHS** ✓ compliant glass
- **ECO-550** - LightPath's exclusive **RoHS** ✓ compliant glass
- Black Diamond™ infrared glass (**BD-2**) for thermal imaging and other IR applications
- **PBH71** for lenses requiring high index
- Radiation hardened glasses for space applications



LightPath's Typical Aspheric Manufacturing Tolerances*

Parameter	Commercial (standard)	Precision
Center Thickness (CT)	± 0.025 mm	± 0.010 mm
Outer Diameter (OD)	± 0.015 mm	± 0.005 mm
Wedge (arcmin)	4	2
Power/Irregularity (fringes)	3/1	1/0.5
Surface Roughness	15 nm	5 nm
Surface Quality (scratch/dig)	40/20	20/10

*Manufacturability depends on size & shape of the optics, as well as production volume.

Most moldable glasses from Corning®, Schott®, Sumita®, & CDGM® can be used with LightPath's molding process.

Contact us to discuss lens designs using any of these moldable glasses.

Molded Glass Lens Arrays

By utilizing LightPath's molded lens technology it is now possible to manufacture lens arrays with high precision. Unlike etched lens arrays, where there is a great deal of non-uniformity from array to array, molding will consistently produce the same structure and performance from prototype to large production builds. Consistent focal lengths and form ease the manufacturing requirement for the end user. The molding technology also allows optical designs that require greater sag (lens thickness) such as high numerical aperture collimators for laser diode arrays. Lens arrays can be produced for direct coupling (finite conjugative) or collimating applications. Pitch tolerances are typically less than one micron and lenses can also be placed with varying pitches across the array.



Tx™ Asphere Wafer-Based Molded Optics

Designed and manufactured for today's high performance transmitters, Tx™ Aspheric lenses utilize LightPath's proprietary wafer-scale glass manufacturing techniques, delivering performance, size and price. By molding an entire wafer of lenses at one time and then dicing them individually, production cost is significantly reduced over single lens molding. The dicing operation results in a square form factor lens that can make mounting easier. All lenses are 100% inspected, tested, and AR coated.

Black Diamond™ Infrared Lenses

LightPath's Black Diamond™ lenses are infrared lenses manufactured from moldable chalcogenide glass. LightPath's BD-2 glass can be customized for applications between 1 micron and 14 microns in wavelength, opening up new applications in thermal imaging and smart sensors.



Black Diamond Manufacturing Tolerances*

Parameter	Typical Value
Center Thickness (CT)	± 0.030 mm
Diameter	± 0.015 mm
Wedge	4 arcmin
Power/Irregularity	3/1 fringes at 633 nm
Roughness	15 nm
Refractive Index	± 0.005

* Manufacturability depends on size and shape of the optics, as well as production volume.

Imaging and Optical Assemblies

By leveraging our broad optical component portfolio, LightPath has a track record for implementing sophisticated integrated optical assemblies. Our in-house engineering staff can design custom assemblies, including complex imaging systems for camera systems, to your exact specifications. Additional services include thermal analysis and athermalization for better performance across a large temperature range.



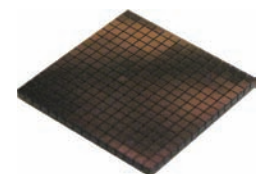
GRADIUM® Lenses

Ideal for high power applications, GRADIUM® lenses and their gradient-index structure often allow a GRADIUM® singlet to replace a conventional spherical doublet. GRADIUM® lenses can be custom designed for visible or near infrared applications in diameters from 5 mm to over 100 mm. GRADIUM® doublets are also available for better achromatic performance and can equal the performance of conventional triplets.



RoHS Compliant Optical Isolators

LightPath's RoHS compliant isolators can be customized for telecom wavelength ranges in single, one and a half, and two stage compositions. LightPath produces simpler latched isolator configurations, robust isolator designs for long haul and undersea applications with bases and magnets using automated processes and epoxy free isolator assemblies. A variety of different housings are also available to make integrating to the customer's package easy.



Oasis™ Isolators

LightPath offers Oasis™ integrated isolators. These isolators are a combination of an aspheric lens and an optical isolator. Oasis™ isolators reduce the number of parts in a system and allow easier assembly and alignment.