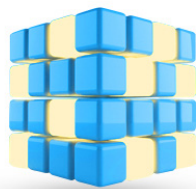


Expertise



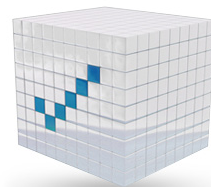
PASSIVE AND ACTIVE COMPONENT DESIGN

- Multi-element and aspheric lenses
- Optical fiber and waveguide structures
- All-fiber components – couplers and Bragg gratings
- Micro-optic components and optical assemblies
- Mechanically and thermally tuned devices



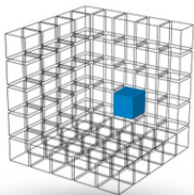
LASERS AND OPTICAL SYSTEMS

- Fiber lasers and amplifiers
- Fiber-based assemblies and systems
- Opto-electronic sensing and instrumentation



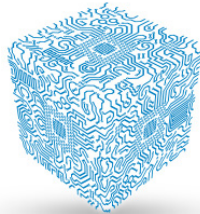
TEST AND MEASUREMENT

- Optical front ends
- Optoelectronic and vision-based measurements
- Environmental controls
- Automated sequencing and parametric characterization



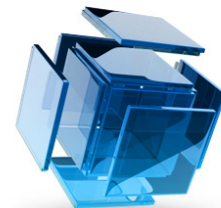
ZEMAX AND PHYSICAL MODELING

- Zemax sequential, non-sequential and physical propagation
- CAD integration
- Ad-hoc models



ELECTRONICS

- Low power mixed signal circuit design
- USB galvanic isolation
- Design for test and design for manufacturing
- EMC compliance
- PCB layout and rapid prototyping



SYSTEMS

- Opto-electronic integration
- Enclosures
- Firmware and software

Expertise



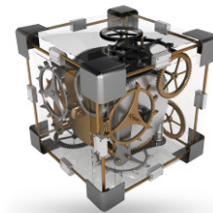
AUTOMATION

- Customized, intelligent computer-controlled stations
- Process automation
- Pneumatics/motion/sensors/vision
- Electronics and software
- Data management



ASSEMBLY STATIONS

- Vision and parametrically driven motorized actuation
- UV cure, inductive and laser reflow
- Dispensing automation
- Accurate micro gripper design and contact sensing
- Custom electronics and actuation solutions
- Sequencing and full software automation



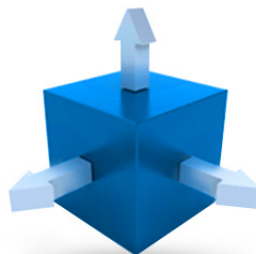
MECHANICAL DESIGN

- Solid modeling
- Detailed drawing and sourcing
- BOM generation



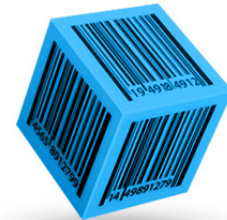
MACHINING AND RAPID PROTOTYPING

- In-house 3D printing of plastic composites
- In-house 3-axis Benchman XT for precision milling with 40k RPM spindle
- Extensive network of close collaborators offering high precision machining and finishing with fast turn around (aluminum, stainless, brass, copper, ceramics, kovar, invar, plastics etc.)



FINITE ELEMENT ANALYSIS

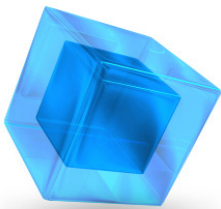
- Strain/stress
- Thermal modeling
- Computational flow dynamics



MANUFACTURING

- Manufacturing line optimization and setup
- NPI including:
 - Product and process documentation and KPIs
 - Staff training in preproduction environment
 - Technology transfers
 - Supplier management

Expertise



PACKAGING AND ENCAPSULATION

- Materials and processes: adhesives, solders, glasses, ceramics, plastics, alloys, composites, plating and vacuum coatings, reflows, curing, plasma cleaning
- Hermetic sealing, polymer seals and molecular sieve moisture/hydrogen management
- Thermal stress management
- Fiber optic and micro-optic component package design
- Laser and detector pigtailling
- Fiber optic module design, fiber management solutions and assembly processes



LASER POWER HANDLING

- Packaging design for multi-kW lasers, components and fiber cables
- Package atmosphere management
- Optical loss thermal management solutions
- Stepped stress plans and failure analysis



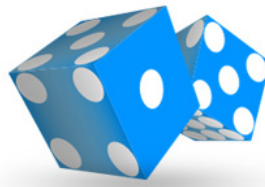
FAILURE MODE ANALYSIS

- SEM, AFM, cross-sectional analysis
- Hermeticity issues, fine leak testing, internal vapor analysis
- Fiber fractography analysis
- Documentation and reporting
- Customer interface, liability estimates, corrective action plans



SCREENING

- Proof testing
- Hermeticity qualification and controls
- Burn-in and stress testing
- Sampling methodology



RELIABILITY PREDICTIONS

- Low FIT (0.1FIT) designs, analysis and test plans for critical deployments
- Failure data analysis and plotting – Log-Normal, Weibull, etc.
- Fiber integrity and reliability predictions based on the power law model
- Reliability test plans and qualification
- Product maintenance through reliability estimates and failure mode analysis