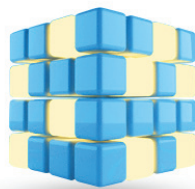# XVP PHOTONICS

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
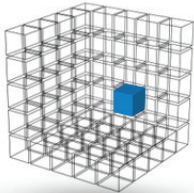- Mechanically and thermally tuned devices

LASERS AND OPTICAL SYSTEMS

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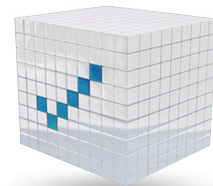
TEST AND MEASUREMENT

- 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 AND FIRMWARE

- Fast photodiode circuit (>1GHz) and short pulse (<ns) fast amplitude modulation (10MHz) laser driver for Lidar applications
- Precision photodiode circuit (<10kHz) for low noise, low light measurements, in spectroscopy applications (nW sensitivity)
- Precision thermopile circuit for laser power measurements (µW resolution)
- Miniature camera sensor for endoscopes applications
- High power (kW) high efficiency laser driver with PWM and analog power modulations
- Continuous wave laser driver with PWM and analog power modulations (MHz)
- Precision and high-power TEC controller
- BLDC and stepper motor controller
- PCB layout and rapid prototyping
- C/C++ development
- RTOS & bare metal
- VHDL, VERILOG for FPGA/CPLD
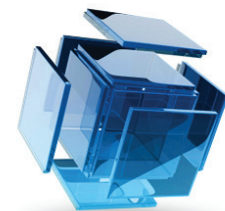
SYSTEMS

- Opto-electronic integration
- Enclosures
- Firmware and software

AUTOMATION

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

ASSEMBLY STATIONS

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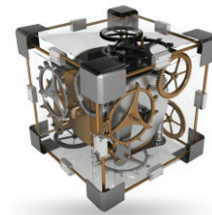
MECHANICAL DESIGN

- 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.)
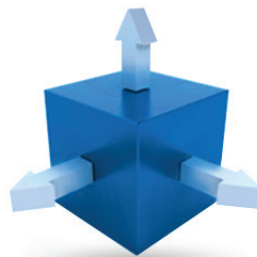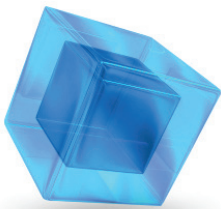
FINITE ELEMENT ANALYSIS

- Strain/stress
- Thermal modeling
- Computational flow dynamics
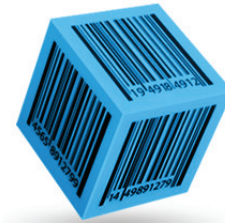
MANUFACTURING

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

XVP PHOTONICS

Expertise

PACKAGING AND ENCAPSULATION

- Materials and processes: adhesives, solders, glasses, ceramics, plastics, alloys, composites, plating & 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 pigtailing
- Fiber optic module design, fiber management solutions & 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