

# Optical Alignment Motion System

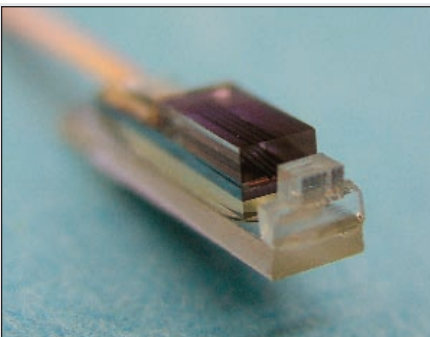
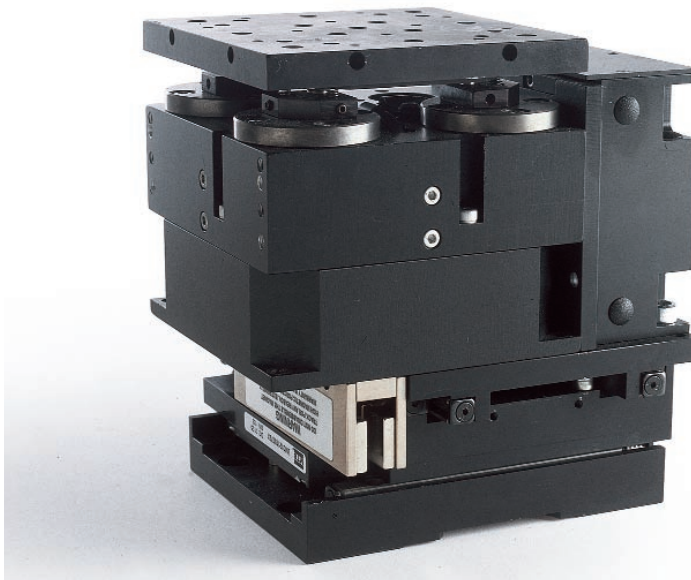
**FAST 6**

## Fast, Accurate Optical Alignment

Palomar Technologies FAST™ 6 is a multi-axis nano-positioning stage and control system designed specifically for photonics component alignment and assembly.

### KEY FEATURES

- ▶ **2 to 6 axes** of high-resolution, closed-loop motion for coordinated control and active alignment in X, Y, Z, Pitch, Roll, and Yaw
- ▶ **Virtual pivotpoint** aligns about the true optical center for greater coupling efficiency
- ▶ **Direct drive motors** yield ultra-fine step sizes for superior optical alignment, repeatability, and stability
- ▶ **Active alignment algorithms** are compatible with any input signal and device for unmatched flexibility
- ▶ **Nanometer-level resolution** in a long travel stage enables active alignment and load / unload from a single, compact device
- ▶ **PC-based** motion control for true open-architecture and state-of-the-art performance



### TYPICAL DEVICES

- ▶ AWGs
- ▶ VOA's
- ▶ Couplers
- ▶ Laser Diodes
- ▶ Discrete Optics
- ▶ Transmitters
- ▶ Splitters
- ▶ TOSA/ROSA
- ▶ Modulators
- ▶ Switches
- ▶ VCSELs
- ▶ Fiber Arrays
- ▶ Collimators
- ▶ Thin-film Filters
- ▶ Receivers

 **PALOMAR  
TECHNOLOGIES**

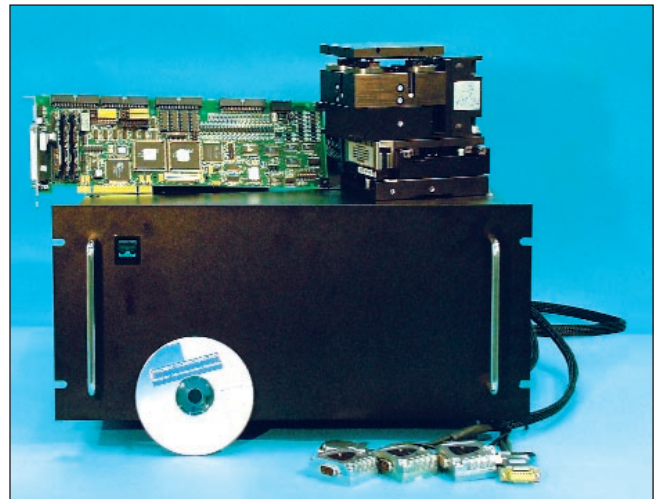
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# Optical Alignment System for Test & Production Applications

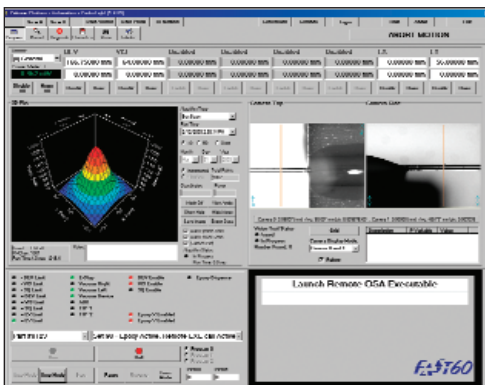
— *Production-grade positioning in a flexible platform*

## WHY CHOOSE THE PALOMAR TECHNOLOGIES FAST™ 6?

- ▶ Fine resolution in a long travel motion system eliminates the need for a dual coarse/fine positioner
- ▶ Production-grade construction and non-contact drive system ensures long-term, reliable operation in lab or manufacturing environment
- ▶ Compact footprint streamlines system architecture and minimizes stack-up errors
- ▶ Open architecture PC bus-based control system is powerful, easy-to-use and interfaces to any test instrument and programming language
- ▶ Comprehensive product line ranging from component solutions to full in-line automation optimized specifically for photonics applications
- ▶ Advanced Process & Photonics Labs available to assist in new device process development
- ▶ Worldwide applications and service support.



▲ **Alignment system:** The FAST 6 alignment engine includes a 2- to 6-axis alignment stage, PC-based motion controller, amplifier chassis, and user software including active alignment algorithms.



▲ **Full Control:** Flexible, user-friendly software puts the operator in control of the FAST 6.

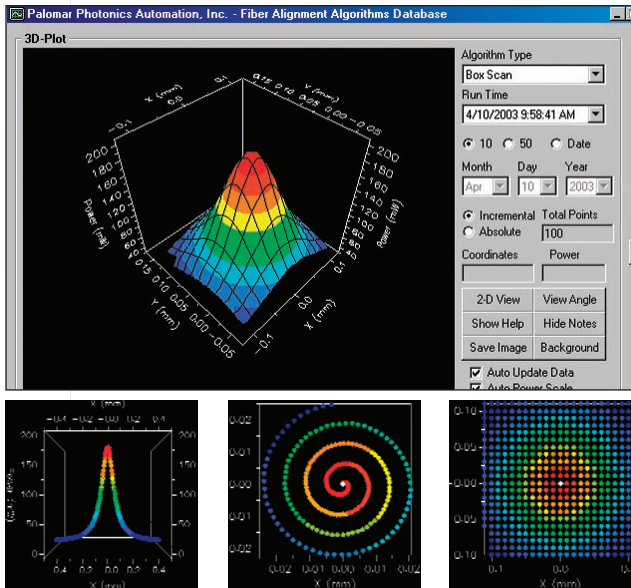
## ADVANCED CONTROL SOFTWARE

An easy to use yet powerful software toolkit, ControLight provides all of the functionality needed to develop a powerful test or robust manufacturing process.

- ▶ Sophisticated, multi-axis PCI bus-based motion control supported from user-friendly front end Man Machine Interface
- ▶ Full suite of software libraries available for development in Visual basic, C, or LabVIEW.

## ADVANCED ALIGNMENT ALGORITHMS

A wide range of optical power peaking algorithms enables the FAST 6 system to tackle the most complex alignment challenges.



- ▶ First light routines through optional high-resolution machine vision system or via optical search routines
- ▶ High speed alignment routines are capable of power peaking across all axes
- ▶ Advanced data logging, analysis, and graphing tools to accurately profile photonic devices
- ▶ Open architecture interfaces allow integration to a wide range of power meters including analog, GPIB, USB, ethernet, IEEE-1349, PC-bus, etc.
- ▶ Programmable parameters help optimize speed and throughput based on device characteristics
- ▶ Built-in access capability for users to develop proprietary algorithms.

▲ **Finding Peak Power:** In addition to our high-speed gradient search routine for acquiring peak power, the FAST 6 includes several additional algorithms useful for finding first light and device profiling. From left: line scan, spiral scan, and box scan.

## UPSTREAM MIGRATION

Palomar's products are designed in a modular fashion, allowing an efficient migration path as your requirements evolve.

- ▶ Scalable software architecture enables processes and programs developed on a component system to be migrated easily to any of Palomar's automated machines.
- ▶ Designed to meet the rigors of 24/7 production, the FAST 6 is well suited for development and manufacturing environments
- ▶ Palomar's dedication to excellence in photonics automation ensures constant product improvement and state-of-the-art technology.

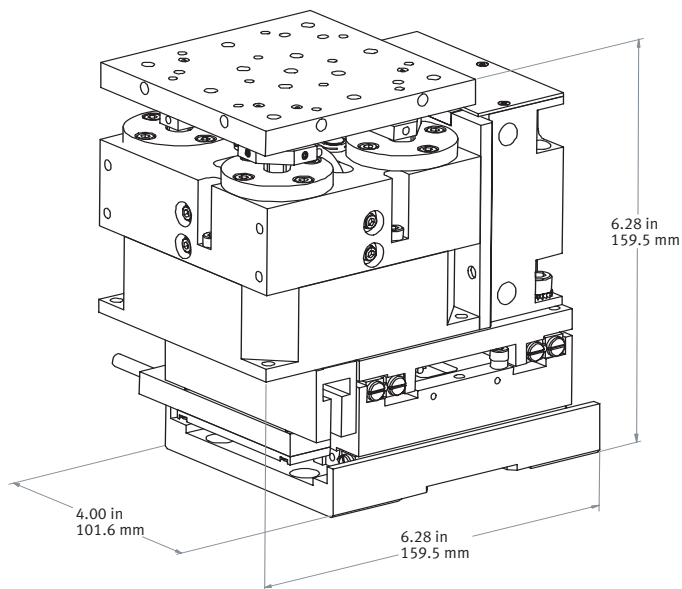


▲ **Migrating to Automation:** Palomar offers a full migration path from component and process development, to semi-automated production, and full in-line assembly solutions.

## SPECIFICATIONS, REQUIREMENTS AND OPTIONS

	X	Y	Z	Roll	Pitch	Yaw
<b>Travel<sup>1</sup></b>	20-50 mm	Up to 5mm	20-50mm	Up to 5°	Up to 5°	5°
<b>Resolution</b>	5 nm			0.1 arc sec		
<b>Optical Repeatability</b>	0.01dB (SM-SM alignment), 3-sigma					
<b>Velocity</b>	50mm / s			50° / s		
<b>Load<sup>2</sup></b>	6-axis	0.25kg				
	3-axis	0.5kg				
<b>Weight</b>	Stage	4.8kg (6-axis)				
	Drive Chassis	15.0kg (6-axis)				
<b>Material</b>	Aluminum (Black anodized finish with Teflon® hardcoat tabletop)					
<b>Motion Controller<sup>3</sup></b>	8-axis, 150MHz DSP, PCI bus (up to 32-axis available)					
<b>Motion Software<sup>3</sup></b>	ControLight MMI and process development software					
	NI LabVIEW®, Visual Basic®, C libraries					

- Notes:
1. Longer travel axes are available as an option. Certain axes are interdependent as a function of pivotpoint location and may reduce the travel of other axes. Please consult factory.
  2. Consult Palomar for loads exceeding specification.
  3. Consult Palomar for additional motion controller and software specifications.



— 6-Axis FAST 6

### Flexibility

The FAST™ 6 is available in one- to six-axis configurations.

Our modular design enables axes to be added easily if requirements change.

