

Automated Alignment for Immersive Displays

RPA's Automated Alignment Systems provide highly adaptable, precision alignment capabilities for immersive display systems of all types. We have solutions for traditional immersive as well as helmet mounted displays.

Our solution provides precise measurement of display system geometry, colorimetry, and luminance within immersive display systems. Using high accuracy gimbal pointing combined with calibrated color camera options, we provide a measurement device capable of operating over a full 360 degree azimuth and 135 degree elevation range with options for eye limiting resolution accuracy.

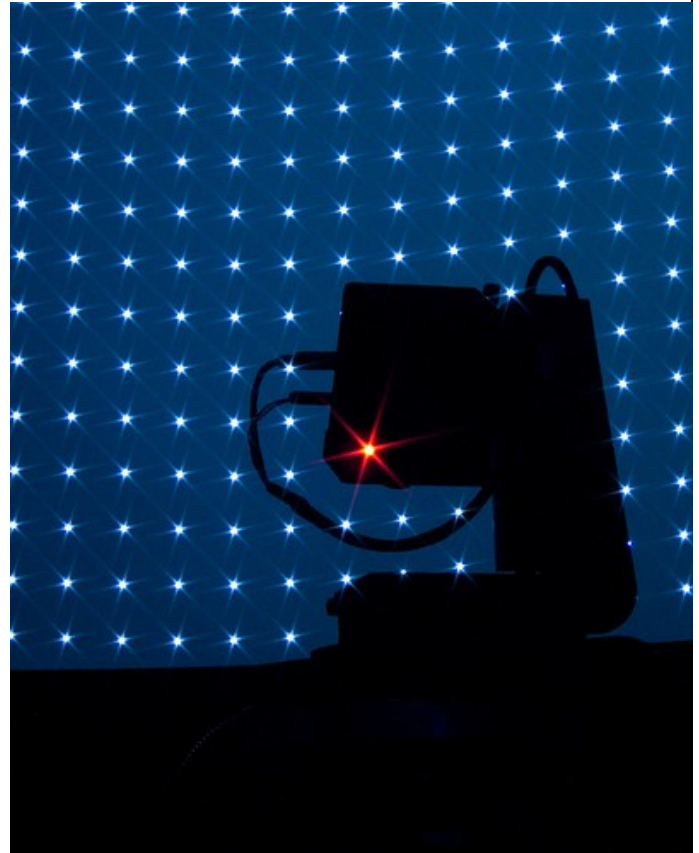
User controlled (X,Y,Z) displacement is available as an option to accurately position the camera and perform measurements at multiple locations. Uses can include obtaining very accurate measurements from a specific position, or obtaining measurement from the outer ranges of viewer head motion to provide dynamic display distortion correction.

A version of the alignment head assembly is available for use within the small confines of HMD devices to accurately measure performance at each eyepoint and within the viewing aperture of each eye. In this configuration, the system can orient to one eye display, automatically translate to the second eyepoint and measure and verify alignment between both views.

RPA has options for image source independent solutions using our hardware image post-processing platforms, or software solutions that become an integral part of the image generation platform. These platforms communicate directly with the measurement system to generate and display required alignment patterns, correct system parameters with feedback and provide real-time, low latency correction during normal system operation.

An integral visible laser rangefinder is provided for display surface mapping, screen installation aid, and to support display channel rough alignment by adding the ability to draw an outline of required display regions to allow quick and easy manual setup and rough alignment of display sources.

This patent pending technology has been SBIR developed, providing an existing contract vehicle and advantages for DoD programs.



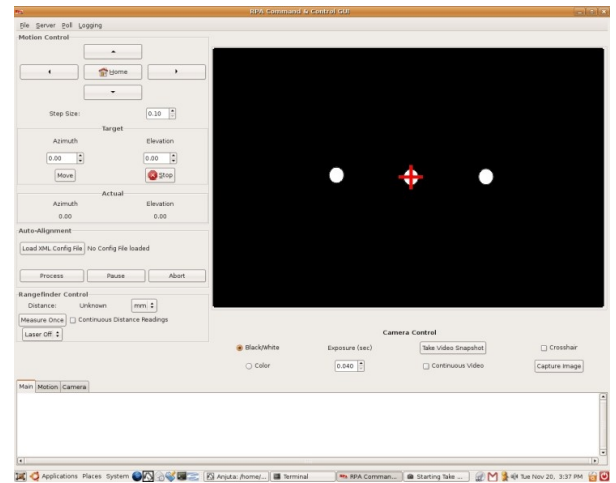
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Automated Alignment for Immersive Displays

Standard Capabilities

- Precision Geometric Alignment
- Color Matching
- Luminance Matching
- Edge Blending
- Masking
- Black Level Offset
- GUI Control for User Setup / Interaction



Unique Capabilities

- Off Axis Alignment Head Positioning
 - Geometry projection software allows the gimbal mounted camera to be located off axis from the display design eyepoint.
- Screen Installation Support
 - The integrated rangefinder can be used to accurately locate a screen to specified coordinates to ensure proper setup.
- Display Channel Setup Support
 - The rangefinder's visible laser can draw outlines of each display channel region of coverage to provide for rapid setup and minimized overscan to preserve resolution.
- Screen Measurement / 3D Mapping
 - A complete screen surface map is derived in system using the gimbal mounted rangefinder. This map is used in geometric projection software to calculate the location for every alignment point on the real display surface.
 - This surface map can also be used for display system acceptance testing to ensure compliance with design specifications.

Specifications

Geometric Accuracy	<i>Gimbal Options</i>	1 arc min to 5 arc min
Range of Operation	<i>Azimuth</i>	360 degrees
	<i>Elevation</i>	+90 to -45 degrees (min)
Light Level Support	<i>Camera Options</i>	.001 to 15 fL
Motion Support	<i>Linear Stage Options X,Y Range</i>	6 inch
	<i>“ “ “ Z Range</i>	12 inch
Alignment Head	<i>Fixed Displacement Options</i>	Tailored to meet specified needs
	<i>Position</i>	Off axis viewing support
	<i>Orientation</i>	Horizontal or Vertical

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