126. The three-dimensional display of claim **125**, wherein at least one of said at least three pulsed optical sources is located on the same side of the optical mixer as a viewer of the display.

127. The three dimensional display of claim **121**, wherein said non-linear mixer material is square, rectangular, trapezoidal, triangular, polyhedral, or circular in cross-section.

128. The three dimensional display of claim **122**, wherein said wavelength filter is square, rectangular, trapezoidal, triangular, polyhedral, or circular in cross-section.

129. The apparatus of claim **76**, wherein said intersecting locations are labeled with bar codes.

130. The apparatus of claim **76**, wherein said intersecting locations are labeled with numerals and bar codes.

131. An apparatus for capturing three-dimensional images, comprising:

at least one two-dimensional optical recorder;

at least one holographic calibration plate having a common holographic calibration pattern, said at least one holographic calibration plate being placed between a desired object and said at least one two-dimensional optical recorder; and

a light source of at least one calibration wavelength for illuminating said at least one holographic calibration plate so as to project a virtual calibration pattern into a field of view of said at least one two-dimensional optical and proximal to the desired object.

132. The apparatus of claim **131**, wherein the desired object is at least partially surrounded by a continuous holographic correction plate.

133. The apparatus of claim **131**, wherein at least one two-dimensional optical recorder moves to various positions to capture a plurality of images of the desired object.

134. The apparatus of claim **131**, wherein said optical recorder is capable of separating desired and calibration wavelengths.

135. The three-dimensional display of claim **6**, wherein said plurality of non-linear mixer elements are non-contiguous, discrete elements arranged on a surface such that any element in any voxel of the display is capable of optical excitation by a combination of said at least three pulsed optical sources to produce said at least one pre-determined wavelength.

136. The three-dimensional display of claim **5**, further comprising a pulse controller for controlling said at least three optical pulse sources, wherein independent attenuation in said pulse controller is provided by a spatial light modulator.

137. The three-dimensional display of claim **118**, wherein said desired optical wavelength corresponds to a primary color.

138. The three-dimensional display of claim **137**, wherein said primary color is one of red, blue and green.

139. The three-dimensional display of claim **117**, wherein said sub-elements are spaced to minimize unintended excitation of sub-elements adjacent to a sub element which is being excited by overlapping pulses.

140. The method of claims **49**, **50**, or **51**, wherein at least one laser ranging device illuminates and measures distances to points on the desired object using least one calibration wavelength.

141. The apparatus of claim **68**, wherein said at least two optical recorders are a combination of two-dimensional and three-dimensional optical recorders.

142. The apparatus of any of claims **104**, **105**, **106**, or **107**, wherein the selected calibration intervals provide synchronization of the optical recorders and other camera-related functions, and wherein the optical recorders capture a calibration wavelength during selected frames and captures only a desired wavelength during non-selected frames.

143. An apparatus for calibrating a multi-dimensional optical recorder, comprising:

a holographic calibration plate having a common holographic calibration pattern, said holographic calibration plate being placed between a desired object and the multi-dimensional optical recorder; and

a light source of at least one calibration wavelength for illuminating said holographic calibration plate so as to project a virtual calibration pattern into the field of view of the optical recorder and proximal to the desired object.

144. The apparatus of claim **143**, wherein said light source is pulsed to provide time code for use by multiple three-dimensional imaging systems.

145. The apparatus of claim **143**, wherein said light source is pulsed to provide synchronization to multiple three-dimensional imaging systems.

146. The apparatus of claim **143**, wherein said light source is pulsed to provide time code and synchronization to multiple three-dimensional imaging systems.

147. A method for determining spatial positions of imperfections in diamonds, comprising the steps of:

illuminating a calibration hologram with one of a plurality of calibration wavelengths so as to project one of a plurality of three-dimensional calibration grids into a field of view of a stereographic microscope;

selecting one of said plurality of calibration wavelengths that yields a grid intersection point of said one of a plurality of three-dimensional calibration grids nearest to the diamond imperfection; and,

calculating a position of said diamond imperfection using next nearest intersections of said one of a plurality of three-dimensional calibration grids generated by said selected calibration wavelength.

148. A method for counting biological specimens under a stereoscopic microscope, comprising the steps of:

illuminating a calibration hologram with one of a plurality of calibration wavelengths so as to project one of a plurality of three-dimensional calibration grids into a field of view of the stereographic microscope;

selecting one of said plurality of calibration wavelengths that yields a grid intersection point of said one of a plurality of three-dimensional calibration grids nearest a specimen to be counted;

calculating the position corresponding to said specimen using next nearest intersections of said one of a plurality of three-dimensional calibration grids generated by said selected calibration wavelength; and

counting specimens whose positions are known relative to the selected three-dimensional calibration grid.

149. The method of claim **147** or **148**, wherein the next nearest intersections are independently chosen from said plurality of three-dimensional calibration grids.

150. The method of claim **147** or **148**, wherein one calibration wavelength is used to record a three-dimensional calibration grid.