7. The three-dimensional display of claim **5**, wherein said pulses emanating from said at least three pulsed optical sources are ultra short optical pulses.

8. The three-dimensional display of claim **5**, wherein said ultra short optical pulses have a pulse width in the range of femtoseconds to nanoseconds.

9. The three-dimensional display of claim **5**, further comprising at least one optical filter adapted to permit the passage of said at least one pre-determined wavelength.

10. (canceled)

11. The three-dimensional display of claim **6**, wherein said optical mixer recurrently sweeps through every voxel in said display space.

12. The three-dimensional display of claim **11**, wherein said optical mixer is planar in shape.

13. The three-dimensional display of claim **12**, wherein said optical mixer moves periodically back and forth in a direction normal to the plane of said optical mixer.

14. The three-dimensional display of claim **11**, wherein said optical mixer rotates about an axis.

15. The three-dimensional display of claim **11**, further comprising display electronics.

16. The three-dimensional display of claim **11** or claim **14**, wherein said optical mixer is of a shape such that said optical mixer is capable of producing desired wavelengths in each voxel of said display space and a mapping of said shape is known to display electronics.

17. The three-dimensional display of claim **16**, wherein said display electronics selects combinations of said at least three pulsed optical sources to produce desired wavelengths at desired voxels and stores alternative possible combinations of said at least three pulsed optical sources as lists of predetermined pulsed optical source combinations, wherein said predetermined lists of alternative possible combinations of pulsed optical sources equalize the peak intensity of the desired wavelengths produced from said combinations of said at least three pulsed optical sources, and wherein said display electronics allows for the simultaneous excitement of voxels in said display space.

18. The three-dimensional display of claim **6**, wherein a subset of said at least three pulsed optical sources operate so as to excite said optical mixer in a plurality of voxels with a predetermined combination of optical frequencies so as to produce a plurality of desired wavelengths in a time interval that is much less than the repetition rate of movement of said optical mixer so that persistence of vision of the viewer makes the illumination of said voxels appear to be simultaneous.

19. The three-dimensional display of claim **18**, wherein different subsets of said at least three pulsed optical sources are chosen for different voxels and different positions of said optical mixer so as to maintain an approximately constant conversion efficiency.

20. The three-dimensional display of claim **18**, wherein each of said plurality of non-linear mixer elements has a cone of acceptance which is used to select the different subsets of said at least three pulsed optical sources for different voxels and different positions of said optical mixer.

21. The three-dimensional display of claim **18**, wherein said at least three pulsed optical sources operate so as to excite said optical mixer in said plurality of voxels to produce said desired wavelengths.

22. The three-dimensional display of claim **18**, wherein one of said at least three optical sources emits a pulse of a pre-selected intensity and pulse width so as to control the brightness of the light produced in said plurality of voxels.

23. The three-dimensional display of claim **18**, wherein one of said at least three pulsed optical sources emits pulses having durations longer than durations of pulses emitted by the remaining pulsed optical sources.

24. The three-dimensional display of claim **5**, wherein each of said at least three pulsed optical sources includes a wavelength generator and a lens for focusing a wavelength of light.

25. The three-dimensional display of claim **24**, wherein said wavelength generator is a point source of light and is located at the focal point of said lens.

26. The three-dimensional display of claim **5**, wherein each of said at least three pulsed optical sources includes a wavelength generator, an optical splitter for dividing an optical pulse emitted by said wavelength generator into multiple optical pulses, and a pulse controller for independently delaying and attenuating each of said multiple optical pulses.

27. The three-dimensional display of claim **5**, wherein said optical mixer moves periodically at a rate of repetition of at least twenty frames per second.

28. The three-dimensional display of claim **6**, wherein said plurality of non-linear mixer elements is composed from a non-linear optical material chosen from the group consisting of $LiNbO_3$, $LilO_3$, KH_2PO_4, Tl_3AsSe_3 (TAS), Hg_2Cl_2, KH_2PO_4 (KDP), KD_2PO_4 (DKDP or D*KDP), $NH_4H_2PO_4$ (ADP), Hg_2Br_2 and $BaTiO_3$, quantum well structure semiconductors made of GaAs, etc.; organic single crystals made of 4-nitrobenzylidene-3-acetamino-4-methoxyaniline (MNBA), organic single crystals made of 2-methyl-4-nitroaniline (MNA); conjugated organic high molecular compounds made of polydiacetylene, conjugated organic high molecular compounds made of polyarylene vinylene, semiconductor grain-dispersed glass comprising CdS dispersed in glass, and semiconductor grain-dispersed glass comprising CdSSe dispersed in glass.

29-37. (canceled)

38. A three-dimensional image scanner for capturing a three-dimensional image of an object, comprising:

a first pulsed optical source for generating an illuminating optical pulse at an illumination wavelength, said first pulsed optical source directing said illuminating optical pulse toward the object;

a second pulsed optical source for generating a gating optical pulse at a gating wavelength having a controlled time delay relative to said first pulsed optical source;

an optical mixer positioned to receive light reflected from the object at a single wavelength in response to interaction of said illuminating optical pulse with the object, a portion of said illuminating optical pulse and a portion of said gating optical pulse spatially and temporally overlapping each other within the optical mixer, thereby producing a first optical mixer generated pulse indicative of the shape of the object; and

an optical recorder having a plurality of pixels for capturing light emitted by said optical mixer and for capturing light reflected from the object.

39. The three-dimensional image scanner of claim **38**, further comprising display electronics for controlling the relative timing of said first pulsed optical source and said second pulsed optical source.

40. (canceled)