and/or said laser source in such a way as to expose a predefined portion of said reference surface to said radiation according to said vector image;

wherein said vector scanning optical unit comprises a first and a second micro-opto-electro-mechanical systems (MOEMS) arranged in series one after the other with respect to a travelling path of said predefined radiation, each MOEMS system comprising:

- a mirror having a diameter comprised between about 2 mm and about 8 mm associated with a supporting structure through articulation means configured so as to define for said mirror a rotation axis (X1, X2); and
- an actuator suited to move said mirror around said rotation axis (X1, X2) in a quasi-static manner and at an angular speed so that a corresponding marking speed of said laser beam on said reference surface is comprised between about 0.5 m/s and about 3 m/s when said laser source is emitting said predetermined radiation during said vector scanning.

That is to say that the first and second micro-opto-electro-mechanical systems (MOEMS) are arranged with respect to the laser source and to the container in such a way that the laser beam of predefined radiation, incident on the first and second mirrors in sequence, can be directed at points of the reference surface through a corresponding combination of the rotations of said mirrors around said two incident axes to perform the vector scanning according to said vector data image.

The vector scanning optical unit in the stereolitography machine of the invention comprises two MOEMS mirrors each moved by an actuator around an axis. Each MOEMS mirror is rotatable around a single axis only. Preferably, the actuator of each mirror is either of the electrostatic actuation type or of the electromagnetic actuation type. Both these actuations are known in the art and not further detailed in the following. Each MOEMS mirror has a single axis of rotation, but the axis of rotation of the first MOEMS mirror is incident to the axis of rotation of the second MOEMS mirror, that is the two axes are not parallel to each other. A laser beam emitted by a laser source is reflected by the MOEMS mirrors one after the other in series and then onto the working surface (reference surface) of a material in the stereolithography machine, “drawing” a beam trajectory. During this trajectory, the radiation of the laser beam illuminates a portion of the liquid to which the reference surface belongs, so that such portion becomes “harder” (polymerized or cured). The reference surface is thus the “working layer” which is solidified

CLAIMS.

1. Stereolithography machine comprising:

    - a container for a fluid substance suited to be solidified through exposure to predefined radiation;
    - a laser source apt to emit a beam of said predefined radiation;
    - a vector scanning optical unit configured to perform a vector scanning of a reference surface arranged inside said container according to a desired vector data image by means of said predefined radiation;
    - a memory to store said vector data image representative of an image to be scanned on said reference surface;
    - a logic control unit configured for controlling said vector scanning optical unit and/or said laser source in such a way as to expose a predefined portion of said reference surface to said radiation according to said vector data image;

    wherein said vector scanning optical unit comprises a first and a second micro-opto-electro-mechanical systems (MOEMS) arranged in series one after the other with respect to a travelling path of said predefined radiation, each MOEMS system comprising:

        - a mirror having a diameter comprised between about 2 mm and about 8 mm associated with a supporting structure through articulation means configured so as to define for said mirror a rotation axis; and
        - an actuator (12) suited to move said mirror around said rotation axis in a quasi-static manner at an angular speed so that a corresponding marking speed of said laser beam on said reference surface is comprised between about 0.5 m/s and about 3 m/s when said laser source is emitting said predetermined radiation during said vector scanning.
        -

2. Stereolithography machine according to claim 1, wherein said actuator is configured to move said mirror of said first and/or second MOEMS system around said rotation axis at an angular speed so that a corresponding positioning speed of said laser beam on said reference surface is comprised between about 8m/s and about 10 m/s when said laser source is not emitting said predetermined radiation to change position for the scanning of said image.
3. Stereolithography machine according to claim 1 or 2, wherein said two rotation axes of said first and second micro-opto-electro-mechanical systems (MOEMS) are

mutually orthogonal.

4. Stereolithography machine according to any of the preceding claims, wherein said laser source is configured to emit said predefined radiation at a wavelength comprised between about 405 nm ± 10 nm.

5. Stereolithography machine according to any of the preceding claims, wherein said laser source is configured to emit said predefined radiation having an irradiance at the reference surface comprised between about 10 mJ/cm^2 and about 200 mJ/cm^2 .

6. Stereolithography machine according to any of the preceding claims, including a sealed container housing said laser source and said first and second micro-opto-electro-mechanical systems (MOEMS) arranged in series, said sealed contained including a windows realized in a material transparent to said predetermined radiation so that said radiation can exit said container.

7. Stereolithography machine according to any of the preceding claims, wherein said actuator of each one of said first and second micro-opto-electro-mechanical system (MOEMS) is of the electromagnetic or electrostatic type and is configured so as to rotate said mirror around said axis in such a way as to arrange it in an angular position in response to the reception of a control signal emitted by said logic control unit and having a value that is representative of said angular position.

8. Stereolithography machine according to any of the preceding claims, wherein said logic control unit is configured so as to move said mirror of both said micro-opto-electro-mechanical systems (MOEMS) so that the point of incidence of said radiation on said reference surface defines a continuous trajectory that completely covers said predefined portion according to said image data.

9. Stereolithography machine according to any of the preceding claims, wherein said vector scanning optical unit comprises at least one lens configured so as to focus said predefined radiation on said reference surface.

10. Stereolithography machine according to claim 9, wherein said at least one lens comprises a flat field scanning lens.

11. Stereolithography machine according to any of the preceding claims, wherein said fluid substance includes a curable resin.

12. Stereolithography machine according to any of the preceding claims, wherein said first and second micro-opto-electro-mechanical systems (MOEMS) belong to a common integrated circuit.

13. Stereolithography machine according to any of the preceding claims, wherein said laser source includes a power control to vary a power of said predefined radiation

emitted by said laser source, said power control being connected to said logic control unit, said logic control unit being apt to change said emitted power of said predetermined radiation depending on a position of said radiation beam on said reference surface.

14. Stereolithography machine according to claim 12, wherein said laser source power control includes a size control to vary a size of said laser beam of said predefined radiation emitted by said laser source, said size being measured in a cross-section along a plane perpendicular to a travelling direction of said radiation.