CLAIMS

1. A system comprising:

an optical steering module configured to receive reflected light, which reflected light includes a portion of a probe light beam reflected from an object, said reflected light including light of a first polarization type, which optical steering module comprising;

a first optical path allowing passage of light of said first polarization type;

a second optical path, including an optical steering element, allowing passage of light of a second polarization type;

an optical shot generation module optically connected to said optical steering module to receive light from said first optical path and comprising:

a mirror configured to reverse an orientation of light received from said optical steering module, returning the light towards said optical steering module; and

a polarization changing element configured to change light of said first polarization type to light of said second polarization type, light returning from said optical shot generation module to said optical steering module passing through said second optical path of said optical steering module;

a processor configured to generate control signals for control of said optical steering element, based on a predicted position of said object, to steer light emitted from said second optical path towards said object.

2. The system according to claim 1, said control signals are to steer light emitted from said second optical path towards a desired portion of said object.

3. The system according to claim 2, wherein said reflected light is reflected from a known portion of said object and said desired portion of said object is a different to said known portion of said object.

4. The system according to claim 3, wherein said known portion comprises tip of said object and said desired portion comprises body of said object.

5. The system according to claim 1-4, wherein said mirror comprises one or more of:

a phase conjugation mirror;

a retroreflector; and

a cat's eye retroreflector.

6. The system according to any one of claims 1-5, comprising a probe beam light source configured to illuminate the object with a probe beam of light including light of said first polarization type.

7. The system according to any one of claims 1-6, wherein said optical steering module comprises a first polarizer and a second polarizer which both direct light of said first polarization type through said first optical path and direct light of said second polarization type through said second optical path.

8. The system according to any one of claims 1-4, wherein said received light comprises at least one pulse of laser light.

9. The system according to claim 1, wherein said received light comprises a beam having a plurality of pulses of laser light.

10. The system according to any one of claims 1-9, wherein said steering element comprises one or more of:

an adjustable wedge; and

a mirror having adjustable position.

11. The system according to claim 10, wherein said steering element steers light by movement of one or more portion of the steering element;

wherein said steering element includes one or more actuator configured to move said one or more portion of said steering element; and

wherein said controller is configured to send control signals to said one or more actuator.

12. The system according to claim 10, wherein said adjustable wedge includes material having an index of refraction controlled by an applied electrical field, wherein said controller is configured to control said applied electrical field.

13. The system according to any one of claims 1-12, comprising one or more optical amplifier configured to amplify said reflected light to increase a power of said light emitted from said second optical path towards said object.

14. The system according to any one of claims 1-13, comprising one or more sensor configured to measure said reflected light and produce a sensor measurement signal of said reflected light; and

wherein said processor is configured to receive said sensor measurement signal and generate said predicted position using said sensor measurement signal.

15. The system according to any one of claims 1-14, comprising a spatial filter positioned to receive light from said optical steering module and to provide light to said shot generation module, wherein said spatial filter is configured to remove noise from said reflected light.

16. A method of illuminating an object comprising:

receiving reflected light reflected from said object through a first optical path;

reversing a direction of said reflected light;

directing said reflected light through a second optical path;

adjusting a direction of said reversed reflected light, using one or more steering element of said second optical path, said adjusting based on a predicted position of said object to produce target shot light; and

emitting said target shot light towards said predicted position of said object.

17. The method according to claim 16, wherein said reflected light includes, at least partially, light of a first polarization type; and

wherein said directing comprises changing a polarization of said reflected light.

18. The method according to claim 17, wherein said first optical path allows passage of said light of said first polarization type; and wherein said second optical path allows passage of said light of a second polarization type; or

wherein said first optical path blocks passage of light of a second polarization type; and said second optical path blocks passage of said light of said first polarization type.

19. The method according to any one of claims 16-18, comprising determining said predicted position of said object by determining one or both of position and trajectory of said object using said received reflected light.

20. A system comprising:

an optical steering module configured to receive reflected light, which reflected light includes a portion of a probe light beam reflected from an object, which optical steering module comprising;

a first optical path;

a second optical path, including an optical steering element;

an optical shot generation module optically connected to said optical steering module to receive light from said first optical path and comprising:

a mirror configured to reverse an orientation of light received from said optical steering module, returning the light towards said optical steering module; and

a controller configured to control said optical steering element, based on a predicted position of said object, to steer light emitted from said second optical path towards said object.