CLAIMS

1. A method to control the shape of an opening in a formation, the method comprising the steps of:

emitting a laser beam from a fiber optic cable into a direction unit, wherein the direction unit comprises a focusing lens and a collimating lens;

focusing the laser beam in the focusing lens to produce a focused laser;

collimating the focused beam in the collimating lens to produce a directed beam;

directing the directed beam onto a motorized master, wherein the motorized master is contained in a compact scanner, wherein the compact scanner further comprises a motorized slave, wherein the motorized master comprises a master mirror and a master motor, wherein the motorized slave comprises a slave mirror and a slave motor;

operating the motorized master and the motorized slave to produce a controlled beam, wherein the controlled beam moves in a movement pattern;

introducing the controlled beam to a laser head, wherein the laser head comprises an inlet lens, an outlet lens, an air knife, a purging nozzle, a vacuum nozzle, and a temperature sensor;

passing the controlled beam through the inlet lens and the outlet lens, wherein the inlet lens and outlet lens protect the compact scanner from debris;

sweeping the outlet lens with gas from the air knife;

purging the path of the controlled beam with a purging fluid from the purging nozzle;

sublimating the formation to produce the opening, wherein in the shape of the opening is dictated by the movement pattern of the controlled beam; and

vacuuming the dust and vapor with the vacuum nozzle.

2. The method of claim 1, further comprising the steps of:

extending a laser tool into a wellbore extending through the formation, the downhole laser tool comprising the direction unit, the compact scanner, and the laser head;

operating a laser unit to produce the laser beam; and

directing the laser beam through the fiber optic cable from the laser unit to the laser tool.

3. The method of claim 1, wherein the movement pattern is determined based on a ratio of a rotation of motorized master to a rotation of the motorized slave.

4. The method of claim 2, further comprising the step of programming the compact scanner to achieve the movement pattern prior to the step of extending the laser tool into the wellbore.

5. The method of claim 1 further comprising the step of penetrating a casing and cement surrounding the wellbore prior to the step of sublimating the formation.

6. The method of claim 1, wherein the shape of the opening is an oval.

7. The method of claim 1, wherein a power of the laser beam is between 500 W and 2500 W.

8. An apparatus to control the shape of an opening in a formation, the apparatus comprising:

a direction unit, the direction unit is configured to manipulate a size of a laser beam to produce a directed beam, wherein the direction unit comprises a focusing lens and a collimating lens;

a compact scanner optically connected to the direction unit, the compact scanner configured to guide the directed beam to produce a controlled beam, wherein the compact scanner comprises a motorized master and a motorized slave, wherein the controlled beam has a movement pattern; and

a laser head optically connected to the compact scanner, the laser head configured to protect the compact scanner from debris, wherein the laser head comprises an inlet lens, an outlet lens, an air knife, a purging nozzle, a vacuum nozzle, and a temperature sensor.

9. The apparatus of claim 8, further comprising:

a laser unit configured to generate the laser beam; and

a fiber optic cable optically connected to the laser unit, the fiber optic cable configured to transmit the laser beam from the laser unit to the direction unit,

wherein the laser unit is located near a wellbore extending into a formation, wherein the fiber optic extends through the wellbore, wherein the direction unit, the compact scanner and the laser unit are positioned in the wellbore.

10. The apparatus of claim 8, wherein the focusing lens is configured to focus the laser beam to produce a focused beam, further wherein the collimating lens is configured to collimate the focused beam to produce the directed beam.

11. The apparatus of claim 8, wherein the motorized master comprises a master motor and a master mirror.

12. The apparatus of claim 8, wherein the motorized slave comprises a slave motor and a slave mirror.

13. The apparatus of claim 8, wherein the movement pattern is determined by a ratio of a rotation of the motorized master to a rotation of the motorized slave.

14. The apparatus of claim 8, wherein the shape of the opening is dictated by the movement pattern of the controlled beam.

15. The apparatus of claim 8, wherein the shape of the opening is an oval.