## Claims

What is claimed is:

1. A surgical system comprising:

a port assembly, the port assembly being an elongated structure, the port assembly having a central access channel formed through the port assembly between proximal and distal ends of the elongated structure, the port assembly having a plurality of anchor ports;

an instrument arm assembly, the instrument arm assembly having:

a shoulder section securable to a first anchor port of the port assembly ;

a first arm section secured to the shoulder section;

an elbow section secured to the first arm section;

a second arm section secured to the elbow section;

a wrist section secured to the second arm section; and

an end effector section secured to the wrist section, the end effector section having an end effector; and

an image capturing assembly, the image capturing assembly including an image capturing device and a multi-curvable body;

characterized in that

the central access channel and the elongated structure of the port assembly have a common central axis;

the multi-curvable body is an elongated structure having a proximal end securable to a second anchor port of the port assembly and a distal end connected to the image capturing device, the multi-curvable body having multiple regions along its elongated

structure, each of the multiple regions along the elongated structure of the multi-curvable body being separately controllable to adjust in shape from a shape resembling a continuously straight line to a shape resembling a continuously curved line;

wherein the port assembly is configured in such a way that the central access channel enables the instrument arm assembly and the image capturing assembly to be inserted through the central access channel and secured to the first anchor port and second anchor port, respectively, after being inserted through the central access channel; and

wherein each of the multiple regions along the elongated structure of the multi-curvable body is configurable to adjust in shape to have a curvature selected from a plurality of different selectable curvatures and a direction of curvature selected from a plurality of different selectable directions.

2. The surgical system of claim 1, wherein the instrument arm assembly is configurable to provide at least 7 degrees of freedom.

3. The surgical system of claim 2, wherein the instrument arm assembly includes at least one integrated motor to achieve each degree of freedom.

4. The surgical system of claim 3, wherein the instrument arm assembly includes an integrated force and/or haptic feedback subsystem in communication with the at least one integrated motor.

5. The surgical system of claim 1,

wherein the shoulder section is configurable to provide at least two degrees of freedom; and

wherein, when the shoulder section is secured to the first anchor port of the port assembly, the shoulder section is configurable to move in such a way as to transition the instrument arm assembly between a forward-directed position and a reverse-directed position.

6. The surgical system of claim 1,

wherein the multi-curvable body of the image capturing assembly includes a plurality of embedded wires; and

wherein the multi-curvable body of the image capturing assembly is configured to curve at one or more of a plurality of locations, in one or more of a plurality of curvatures, and/or in one or more of a plurality of directions by controlling a length of one or a combination of the embedded wires.

7. The surgical system of claim 1, wherein the image capturing assembly includes a high definition (HD) 3-dimensional (3-D) video camera.

8. The surgical system of claim 1,

further comprising a suction assembly, the suction assembly including a second multi-curvable body and a suction port at an end of the second multi-curvable body operable to apply a negative pressure;

wherein the second multi-curvable body is configurable to curve at one or more of a plurality of locations along the second multi-curvable body, in one or more of a plurality of curvatures, and/or in one or more of a plurality of directions; and

wherein the second multi-curvable body is securable to a third anchor port from among the plurality of anchor ports.

9. The surgical system of claim 1,

further comprising an assistant arm assembly, the assistant arm assembly including a second multi-curvable body and an instrument at an end of the second multi-curvable body;

wherein the second multi-curvable body is configurable to curve at one or more of a plurality of locations along the second multi-curvable body, in one or more of a plurality of curvatures, and/or in one or more of a plurality of directions; and

wherein the second multi-curvable body is securable to a third anchor port from among the plurality of anchor ports.

10. The surgical system of claim 1, further comprising a second instrument arm assembly securable to the port assembly, the second instrument arm assembly having:

a second shoulder section securable to a third anchor port of the second end section;

a second first arm section secured to the second shoulder section;

a second elbow section secured to the second first arm section;

a second second arm section secured to the second elbow section;

a second wrist section secured to the second second arm section; and

a second end effector section secured to the second wrist section, the second end effector section having a second end effector.

11. The surgical system of claim 1, further comprising a controller, the controller in communication with one or more of the following:

the shoulder section;

the elbow section;

the wrist section;

the end effector section;

the image capturing device; and/or

the multi-curvable body of the image capturing assembly.

12. The surgical system of claim 1, further comprising an external anchor assembly securable to a fixedly positioned object, the external anchor assembly configurable to secure to the port assembly, the external anchor assembly configurable to provide at least 3 degrees of freedom.

13. A method of configuring a surgical system, the method comprising:

providing a port assembly, the port assembly being an elongated structure, the port assembly having a first end, a second end, a central access channel formed through the port assembly, and a plurality of anchor ports formed at the second end;

providing an instrument arm assembly, the instrument arm assembly having:

a shoulder section at a first end of the instrument arm assembly;

a first arm section secured to the shoulder section;

an elbow section secured to the first arm section;

a second arm section secured to the elbow section;

a wrist section secured to the second arm section; and

an end effector section at a second end of the instrument arm assembly opposite to the first end of the instrument arm assembly, the end effector section secured to the wrist section, the end effector section having an end effector;

securing a position of the port assembly by securing the first end of the port assembly to an external anchor, the external anchor secured to a fixedly positioned object;

inserting the instrument arm assembly through the central access channel of the port assembly in such a way that the end effector section is the first section of the instrument arm assembly to be inserted into the first end of the port assembly; and

securing the shoulder section of the instrument arm assembly to one of the plurality of anchor ports of the port assembly;

providing an image capturing assembly, the image capturing assembly including an image capturing device and a multi-curvable body;

characterized in that

the central access channel and the elongated structure of the port assembly have a common central axis;

the multi-curvable body is an elongated structure having a proximal end securable to a second anchor port of the port assembly and a distal end connected to the image capturing device, the multi-curvable body having multiple regions along its elongated structure, each of the multiple regions along the elongated structure of the multi-curvable body being separately controllable to adjust in shape from a shape resembling a continuously straight line to a shape resembling a continuously curved line;

wherein the port assembly is configured in such a way that the central access channel enables the instrument arm assembly and the image capturing assembly to be inserted through the central access channel and secured to the first anchor port and

second anchor port, respectively, after being inserted through the central access channel; and

wherein each of the multiple regions along the elongated structure of the multi-curvable body is configurable to adjust in shape to have a curvature selected from a plurality of different selectable curvatures and a direction of curvature selected from a plurality of different selectable directions.

14. The method of claim 13,

wherein the first end comprises a first end channel and a first gate assembly, the first end channel being a part of the central access channel, the first gate assembly configurable to transition between an open position to allow access through the first end channel and a closed position to prevent access through the first end channel; and

wherein the second end comprises:

a second end channel, the second end channel being a part of the central access channel and substantially aligned with the first end channel;

a second gate assembly, the second gate assembly configurable to transition between an open position to allow access through the second end channel and a closed position to prevent access through the second end channel; and

the plurality of anchor ports.

15. The method of claim 14, wherein:

(i) the method further comprises configuring at least one of the first gate assembly and the second gate assembly to be in the closed position so as to block at least one of the first end channel and the second end channel, respectively;

(ii) the first gate assembly includes a first expandable portion, the first expandable portion configurable to expand when the first gate assembly is configured to the closed position;

wherein the second gate assembly includes a second expandable portion, the second expandable portion configurable to expand when the second gate assembly is configured to the closed position;

wherein, when the first gate assembly is configured to the closed position, the first expandable portion is operable to substantially block a gas medium from passing through the first end channel; and

wherein, when the second gate assembly is configured to the closed position, the second expandable portion is operable to substantially block a gas medium from passing through the second end channel; or

(iii) the inserting of the instrument arm assembly through the central access channel comprises:

configuring the first gate assembly to be in the open position and the second gate assembly to be in the closed position;

inserting the instrument arm assembly through the first end channel;

configuring the first gate assembly to be in the closed position after the instrument arm assembly is inserted through the first gate assembly;

configuring the second gate assembly to be in the open position;

inserting the instrument arm assembly through the second gate assembly; and

configuring the second gate assembly to be in the closed position after the instrument arm assembly has passed through the second gate assembly.