CLAIMS

1. Hot-melt-extruded integrated tubing, comprising:

a tubing wall of the integrated tubing, the integrated tubing of a first organic polymer;

one or more lumens of the integrated tubing, each lumen of the one or more lumens defined at least in part by the tubing wall;

a plurality of increases in tubing diameter, each increase of the plurality of increases in tubing diameter occurring within a predetermined length of the integrated tubing; and

a longitudinal bead of the integrated tubing between opposing sides of the tubing wall, the longitudinal bead solidified from a hot melt of the first organic polymer forced around one or more optical fibers such that the longitudinal bead integrates the one or more optical fibers therein.

2. The integrated tubing of claim 1, wherein the integrated tubing is cut into a plurality of catheter tubes, each catheter tube including an increase in tubing diameter between a distal-end portion of the catheter tube and a proximal-end portion of the catheter tube.

3. A medical device, comprising:

a hot-melt extruded catheter tube of a first organic polymer including:

a catheter-tube wall of the catheter tube;

one or more lumens of the catheter tube, each lumen of the one or more lumens defined at least in part by the catheter-tube wall; and

an increase in tube diameter between a distal-end portion of the catheter tube and a proximal-end portion of the catheter tube; and

an integrated stylet of one or more optical fibers, the catheter tube including a longitudinal bead between opposing sides of the catheter-tube wall solidified from a hot melt of the first organic polymer forced around the one or more optical fibers such that the longitudinal bead integrates the one or more optical fibers therein.

4. The medical device of claim 3, wherein the catheter tube has one lumen.

5. The medical device of claim 4, wherein the longitudinal bead is incorporated into the catheter-tube wall.

6. The medical device of claim 3, wherein the catheter tube has two or more lumens.

7. The medical device of claim 6, wherein each lumen of the two or more lumens has approximately a same volume as another lumen of the two or more lumens in an arbitrary length of the catheter tube.

8. The medical device of claim 6, wherein at least one lumen of the two or more lumens has a different volume than another lumen of the two or more lumens in an arbitrary length of the catheter tube.

9. The medical device of claim 6, further comprising one or more septa of the catheter tube, each lumen of the two or more lumens further defined at least in part by the one or more septa.

10. The medical device of claim 9, wherein the longitudinal bead is incorporated into the catheter-tube wall.

11. The medical device of claim 9, wherein the longitudinal bead is incorporated into at least one septum of the one or more septa.

12. The medical device of claim 9, wherein the longitudinal bead is incorporated into each septum of the one or more septa.

13. The medical device of any claim of claims 3-12, wherein the longitudinal bead has one optical fiber disposed therein.

14. The medical device of any claim of claims 3-12, wherein the longitudinal bead has a bundle of optical fibers disposed therein.

15. The medical device of any claim of claims 3-14, wherein the distal-end portion of the catheter tube has a smaller tube diameter than the proximal-end portion of the catheter tube, the distal-end portion of the catheter tube configured to interface with a patient's anatomy and the proximal-end portion of the catheter tube configured to interface with procedural equipment or instrumentation.

16. The medical device of any claim of claims 3-15, wherein the medical device is a peripherally inserted central catheter or a central venous catheter.

17. A method for manufacturing integrated tubing, comprising:

threading one or more optical fibers through a die of an extruder;

forcing a molten polymeric material of a first polymeric material through the die around the one or more optical fibers to form the integrated tubing with a longitudinal bead solidified around one or more optical fibers such that the longitudinal bead integrates the one or more optical fibers therein; and

cooling the integrated tubing in a cooling bath by pulling the integrated tubing through the cooling bath with a puller, wherein the rate of pulling the integrated tubing with the puller is varied to create a plurality of increases in tubing diameter of the integrated tubing, each increase of the plurality of increases in tubing diameter occurring within a predetermined length of the integrated tubing.

18. The method of claim 17, wherein the rate of pulling the integrated tubing with the puller is increased to create portions of the integrated tubing with a smaller tubing diameter or decreased to create portions of the integrated tubing with a larger tubing diameter corresponding to the plurality of increases in the tubing diameter.