What is claimed is:

1. A submersible subsea fluid system for operating submersed in a body of water, the system comprising:

a fluid-end housing having an upper end and a lower end;

a fluid rotor disposed to rotate in the fluid-end housing and to receive and interact with a process fluid flowing from a side inlet of the fluid-end housing to a side outlet of the fluid-end housing, the fluid rotor configured to thrust upwards toward the upper end when rotating; and

a bearing near the lower end of the fluid-end housing, the bearing having an upward-facing bearing surface coupled to the fluid rotor and a downward-facing bearing surface coupled to the fluid housing, the bearing surfaces cooperate to support the upward thrust of the fluid rotor,

wherein the bearing further comprises an inactive side that is loaded when the submersible subsea fluid system is not in operation, the upward-facing bearing surface is formed by a material that is different from the inactive side of the bearing.

2. The submersible fluid system of claim 1, further comprising a seal that seals between the fluid-end housing and the fluid rotor and defines an upper boundary of a sump of the fluid-end housing, the seal responsive to provide a variable sealing effect depending on a pressure differential between the sump and another portion of the fluid-end housing.

3. The submersible fluid system of claim 2, wherein the seal is responsive to provide a greater sealing effect when subjected to an increase in pressure in the sump.

4. The submersible fluid system of claim 2, further comprising a liquid injection port into the sump of the fluid-end housing below the seal and coupled to a source of liquid.

5. The submersible fluid system of claim 4, wherein the source of liquid is a

chemical fluid source.

6. The submersible fluid system of claim 4, wherein the source of liquid is the process fluid.

7. The submersible fluid system of claim 2, further comprising a radial bearing in the sump.

8. The submersible fluid system of claim 7, wherein the bearing near the lower end of the fluid-end housing comprises a thrust bearing in the sump.

9. The submersible fluid system of claim 8, wherein the thrust bearing is supported by a damper that absorbs impact energy.

10. The submersible fluid system of claim 7, wherein the bearings comprise fluid-film bearings or magnetic bearings.

11. The submersible fluid system of claim 1, further comprising a damper external to the fluid-end housing.

12. The submersible fluid system of claim 2, further comprising a fluid-cooling system having a fluid inlet coupled to the fluid-end housing and configured to receive fluid from the sump.

13. The submersible fluid system of claim 2, further comprising a fluid rotor active thrust management system comprising:

a sensor for monitoring fluid pressure at a location in the subsea fluid system;

a pressure regulator configured to adjust pressure acting on the fluid rotor in the submersible fluid system; and

a controller configured to receive fluid pressure information from the sensor and to control the pressure regulator to adjust the fluid pressure acting on the fluid rotor in the submersible fluid system.

14. The submersible fluid system of claim 13, wherein the controller controls the pressure regulator automatically.

15. A method comprising:

rotating a fluid rotor of a submersible subsea fluid system in a fluid end housing to intake a fluid through a side inlet of the fluid end housing and drive the fluid from a first end of the rotor to a second end of the rotor and out a side outlet of the fluid end housing, and to thrust the rotor in an upwards direction; and

supporting against the upwards thrust of the fluid rotor with a bearing, wherein the bearing comprises an upward-facing bearing surface coupled to the fluid rotor, a downward-facing bearing surface coupled to the fluid housing, an inactive side that is loaded when the submersible subsea fluid system is not in operation, the upward-facing bearing surface is formed by a material that is different from the inactive side of the bearing.

16. The method of claim 15, wherein the fluid rotor rotates within a housing and the bearing comprises an upward-facing bearing surface coupled to the fluid rotor and a downward-facing bearing surface coupled to the housing.

17. The method of claim 16, further comprising sealing between the housing and the fluid rotor with a seal, the seal defining an upper boundary of a sump of the housing, the seal responsive to provide a variable sealing effect depending on a pressure differential between the sump and another portion of the housing.

18. The method of claim 16, further comprising:

monitoring fluid pressure at a location in the submersible fluid system; and

adjusting pressure acting on the fluid rotor in the submersible fluid system based on information from the sensor.

19. The method of claim 17, where the method further comprises injecting fluid into the sump and maintaining the fluid in the sump with the seal while allowing the rotating fluid rotor to slow to a stop and then restricting fluid passage out of the sump with the seal to land the fluid rotor softly.

20. The method of claim 17, wherein the method further comprises damping rapid axial movement of the fluid rotor by restricting fluid passage into and out of the sump with the seal.

21. A submersible subsea fluid system for operating submersed in a body of water, the system comprising:

a fluid-end housing having an upper end and a lower end;

a sump in the lower end of the fluid-end housing;

a fluid rotor disposed to rotate in the fluid-end housing and to receive and interact with a process fluid flowing from a side inlet of the fluid-end housing to a side outlet of the fluid-end housing, the fluid rotor configured to thrust upwards toward the upper end when rotating; and

a bearing in the sump of the fluid-end housing, the bearing having an upward-facing bearing surface coupled to the fluid rotor and a downward-facing bearing surface coupled to the fluid housing, the bearing surfaces cooperate to support the upward thrust of the fluid rotor,

wherein the bearing further comprises an inactive side that is loaded when the submersible subsea fluid system is not in operation, the upward-facing bearing surface is formed by a material that is different from the inactive side of the bearing.

22. The submersible fluid system of claim 21, further comprising a seal that seals between the fluid-end housing and the fluid rotor and defines an upper boundary of the sump of the fluid-end housing, the seal responsive to provide a variable sealing effect depending on a pressure differential between the sump and another portion of the fluid-end housing.