CLAIMS

1. A downhole assembly, comprising:

a plurality of tubular members extendable within a wellbore and defining a through bore for conveying a fluid therein;

a telemetry device positioned within a wall of one of the plurality of tubular members and providing a secondary flow path having an inlet and an outlet, the inlet and the outlet each fluidly connecting the secondary flow path to the through bore, the telemetry device further providing a valve element engageable with a valve seat provided at an upper end of the secondary flow path; and

a flow restrictor located within the through bore and being axially positioned between the inlet and the outlet of the secondary flow path,

wherein the valve element is actuatable to control fluid flow through the secondary flow path to selectively generate a fluid pressure pulse.

2. The downhole assembly of claim 1, wherein the plurality of tubular members is selected from the group consisting of casing, liner, drill pipe, and production tubing.

3. The downhole assembly of claim 1, wherein the fluid is selected from the group consisting of a drilling fluid, a cement, and combination thereof.

4. The downhole assembly of claim 1, wherein the through bore of the one of the plurality of tubular members is unobstructed by the telemetry device.

5. The downhole assembly of claim 1, wherein the telemetry device is positioned within an upset portion of the one of the plurality of tubular members.

6. The downhole assembly of claim 5, wherein the telemetry device is arranged within a cartridge removably mounted to the upset portion.

7. The downhole assembly of claim 1, further comprising:

an actuator operatively coupled to the valve element; and

a control system that controls movement of the actuator, and thereby controls actuation of the valve element.

8. The downhole assembly of claim 7, wherein the control system comprises one or more sensors selected from the group consisting of an orientation sensor, a geological sensor, and a physical sensor.

9. The downhole assembly of claim 1, wherein the flow restrictor comprises a material selected from the group consisting of aluminum, bronze, a composite, and any combination thereof.

10. The downhole assembly of claim 1, wherein the flow restrictor comprises a burst disk.

11. A fluid-based telemetry device, comprising:

a cartridge removably mounted to a wall of a tubular member that defines a through bore;

a secondary flow path defined through at least one of the cartridge and the tubular member and extending between an inlet fluidly connecting a first end of the secondary flow path to the through bore and an outlet fluidly connecting a second end of the secondary flow path to the through bore;

a valve element arranged within the cartridge and engageable with a valve seat provided at an upper end of the secondary flow path, wherein the valve element is actuatable to control fluid flow through the secondary flow path to selectively generate a fluid pressure pulse; and

a flow restrictor located within the through bore and axially positioned between the inlet and the outlet of the secondary flow path.

12. The fluid-based telemetry device of claim 11, wherein the cartridge is positioned within an upset portion provided on the wall of the tubular member.

13. The fluid-based telemetry device of claim 11, wherein the through bore is unobstructed by the valve element and the secondary flow path.

14. The fluid-based telemetry device of claim 11, further comprising:

an actuator arranged within the cartridge and operatively coupled to the valve element; and

a control system arranged within the cartridge to control movement of the actuator and thereby control actuation of the valve element.

15. The fluid-based telemetry device of claim 14, wherein the control system comprises a sensor selected from the group consisting of an inclinometer, a magnetometer, a gyroscopic sensor, a gamma sensor, a resistivity sensor, a density sensor, a temperature sensor, a pressure sensor, an acceleration sensor, and a strain sensor.

16. A method, comprising:

introducing a downhole assembly into a wellbore, the downhole assembly including a plurality of tubular members that define a through bore and a telemetry device positioned within a wall of one of the plurality of tubular members;

conveying a fluid through the through bore and past the telemetry device, the telemetry device providing a secondary flow path having an inlet and an outlet, the inlet and the outlet each fluidly connecting the through bore to the secondary flow path, the telemetry device further including a valve element engageable with a valve seat provided at an upper end of the secondary flow path;

generating a pressure drop within the through bore with a flow restrictor axially positioned within the through bore between the inlet and the outlet of the secondary flow path; and

actuating the valve element to control fluid flow through the secondary flow path and thereby selectively generating a fluid pressure pulse.

17. The method of claim 16, wherein conveying the fluid through the through bore and past the telemetry device comprises conveying the fluid through the through bore unobstructed by the telemetry device.

18. The method of claim 16, wherein actuating the valve element comprises:

moving the valve element with an actuator operatively coupled to the valve element; and

controlling movement of the actuator with a control system.

19. The method of claim 16, further comprising:

obtaining measurement data of one or more wellbore parameters with one or more sensors included in the telemetry device, the one or more sensors being selected from the group consisting of an orientation sensor, a geological sensor, and a physical sensor;

actuating the valve element to generate fluid pressure pulses corresponding to the measurement data; and

receiving the fluid pressure pulses at a surface location.

20. The method of claim 19, further comprising aligning a pre-milled window defined in the plurality of tubular members with a high side of the wellbore based on the measurement data obtained by the one or more sensors.

21. The method of claim 16, wherein actuating the valve element to control fluid flow through the secondary flow path comprises:

moving the valve element to an open position and thereby allowing a portion of the fluid from the through bore to enter the secondary flow path via the inlet; and

discharging the portion of the fluid back into the through bore via the outlet.

22. The method of claim 16, further comprising removing the flow restrictor from the through bore.

23. The method of claim 22, wherein removing the flow restrictor from the through bore comprises milling out the flow restrictor with a mill or drill bit extended into the through bore, the flow restrictor comprising a material selected from the group consisting of aluminum, bronze, a composite, and any combination thereof.

24. The method of claim 22, wherein the flow restrictor is a burst disk and removing the flow restrictor from the through bore comprises:

increasing a fluid pressure within the through bore to a predetermined fluid pressure; and

breaking the burst disk upon assuming the predetermined fluid pressure.