THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A water meter, comprising:

a flow tube defining a lumen to receive water through the lumen, wherein the flow tube is configured to be coupled to a water supply network;

a housing coupled to the flow tube and containing a self-contained power source, at least one processor, a memory and a wireless transceiver;

a flow sensor positioned to measure liquid flow through the lumen and coupled to the at least one processor to provide flow measurement signals to the at least one processor; and

a vibration sensor arranged to sense vibration in a material of the flow tube and coupled to the at least one processor to provide vibration measurement signals to the at least one processor, the vibration sensor comprising a piezoelectric transducer and is arranged to abut the flow tube without extending into the lumen;

wherein the at least one processor is configured to process the flow measurement signals and the vibration measurements signals and to determine an upstream liquid leakage status based on at least the vibration measurement signals;

wherein the at least one processor is configured to transmit the upstream liquid leakage status and flow measurement ~~information~~ signals to a remote server,

wherein the vibration sensor comprises a sensor base positioned proximal to the flow tube, at least one transducer or transducer substrate coupled to the sensor base, and a seismic weight coupled to the sensor base distal of the at least one transducer or transducer substrate, and wherein the at least one processor receives the vibration measurement signals based on electrical outputs from the at least one transducer or transducer substrate.

2. The meter of claim 1, wherein the at least one processor is configured to determine the upstream liquid leakage status by determining a frequency spectrum of the vibration measurement signals and determining whether an amplitude of the frequency spectrum in at least one frequency band is at or above a predetermined threshold amplitude.

3. The meter of claim 2, wherein the at least one processor is further configured so that, when the amplitude in the at least one frequency band is determined to be at or

above the predetermined threshold amplitude, the at least one processor records a leakage detection indication of a possible upstream liquid leak in the water supply network.

4. The meter of claim 3, wherein the at least one processor sets the upstream liquid leakage status to indicate a detected liquid leak once a predetermined number of leakage detection indications have been recorded.

~~5. The meter of any one of the preceding claims, wherein the vibration sensor comprises a sensor base positioned proximal to the flow tube, at least one transducer or transducer substrate coupled to the sensor base, and a seismic weight coupled to the sensor base distal of the at least one transducer or transducer substrate, wherein the at least one processor receives the vibration measurement signals based on electrical outputs from the at least one transducer or transducer substrate.~~

~~6~~5. The meter of any one of the preceding claim~~s 5~~, further comprising a spring arranged to bias the seismic weight against the at least one transducer or transducer substrate.

~~7~~6. The meter of claim 3 or claim 4, wherein the at least one processor is further configured to apply a ~~second~~ further threshold to the frequency spectrum to determine the likely presence of an upstream fluid conduit burst in the water supply network.

~~8~~7. The meter of any one of the preceding claims, wherein the at least one processor is configured to selectively enable receipt of the vibration measurement signals at predetermined times in a repeating cycle.

~~9~~8. The meter of claim ~~8~~7, wherein the predetermined times are during at least one off-peak water usage period.

~~10~~9. The meter of claim ~~8~~ 7 or claim ~~9~~8, wherein the predetermined times are separated by one to ten time intervals.

~~11~~10. The meter of any one of the preceding claims, further comprising a magnetometer positioned in the housing to sense a magnetic field of the flow tube and configured to provide a magnetic field sensor output to the at least one processor, wherein the at least one processor is configured to determine an electrical current in the flow tube based on the magnetic field sensor output.

~~12~~11. The meter of claim ~~11~~10, wherein the at least one processor is configured to set a leakage current alarm if the electrical current is determined to meet or exceed a human-safe current threshold.

~~13~~12. The meter of any one of the preceding claims, wherein the flow sensor is an ultrasonic flow sensor.

~~14~~13. The meter of any one of the preceding claims, wherein the at least one processor is configured to transmit the upstream liquid leakage status to the remote server from one to five times in a two day period.

~~15~~14. The meter of any one of the preceding claims, wherein the at least one processor comprises a first processor to receive and process the vibration measurement signals and a second processor to receive and process the flow measurement signals.

~~16~~15. The meter of claim ~~15~~14, wherein the first processor provides the upstream liquid leakage status to the second processor for transmission to the remote server.

~~17~~16. The meter of claim ~~15~~14 or claim ~~16~~15, wherein the memory comprises:

a first memory accessible to the first processor but not the second processor; and

a second memory accessible to the second processor but not the first processor.

~~18~~17. The meter of any one of the preceding claims, further comprising at least one sensor selected from:

a pressure sensor to sense water pressure in the flow tube;

a stray current sensor to sense current in the ~~fluid supply conduit~~flow tube;

an electrical conductivity sensor to sense electrical conductivity of fluid in the flow tube;

a fluid temperature sensor to sense temperature of fluid in the flow tube;

a pH sensor to sense pH of fluid in the flow tube;

a turbidity sensor to sense turbidity of fluid in the flow tube; or

a free chlorine sensor to sense free chlorine in fluid in the flow tube.

~~19~~18. A water supply system, comprising:

a network of water supply conduits;

a plurality of water meters of any one of the preceding claims coupled to the network of water supply conduits at spaced water supply endpoints; and

the remote server, wherein the remote server is configured to generate a leakage notification when the upstream liquid leakage status of at least one of the plurality of water meters indicates detection of an upstream liquid leak.

~~20~~19. A server system configured to communicate with a plurality of water meters according to any one of claims 1 to 18 to receive upstream leakage status information from the water meters and to generate a leakage notification when the upstream liquid leakage status of at least one of the meters indicates detection of an upstream liquid leak.

~~21~~20. The server system of claim ~~20~~19, wherein the upstream leakage status information is based on vibrations sensed at the water meters in relation to vibrations transmitted along fluid conduits of an upstream water supply network.

~~22~~21. A system configured to determine leakage in a water supply network, comprising:

a network of fluid supply conduits;

a plurality of water meters according to any one of claims 1 to 18 coupled to the network at spaced water supply endpoints, each water meter configured to take sensor readings of one or more local conditions at the respective water meter and to

communicate a data payload to an external system, the data payload including information based on the sensor readings; and

a remote server to receive the data payloads from the water meters, wherein the remote server is configured to generate a leakage notification when the information indicates a leakage in the water supply network.

~~23~~22. A method of leakage detection in a fluid supply network, comprising,

receiving at a water meter according to any one of claims 1 to 18, coupled at a supply end-point of fluid supply network, vibrations propagated from fluid conduits that form part of the fluid supply network;

determining a leakage status based at least in part on the vibrations; and

notifying a remote server of the leakage status.