

FLOWCOMMAND

VoluSense™ Series

*Satellite connected and non-intrusive **level sensors** with radar sensing technology*



APPLICATIONS & BENEFITS

The FlowCommand VoluSense system gives the power to monitor fluid changes in tanks for an entire oilfield - all from any internet connected device. Example uses:

- Track hauls and pickups from any tank
- Eliminate the risk of leaks and overflows
- Reduce pumper visits
- Significantly improve HSE
- Monitor and measure fluid production into a tank
- Optimize trucking and hauling activity
- Improve fleet load factors

FEATURES

VoluSense sensors install easily, require no maintenance, and automatically send data to FlowCommand servers and software where it is accessible via any internet connected device:

- Non-contact; no issues with clogging or freezing
- Instant installation that only requires a screwdriver
- Retains accuracy across various fluid types and foaming
- Advanced satellite telemetry build in
- Ultra efficient battery
- Intrinsically safe for Class I Div I Groups A-D hazardous locations



DESCRIPTION & COMPONENTS

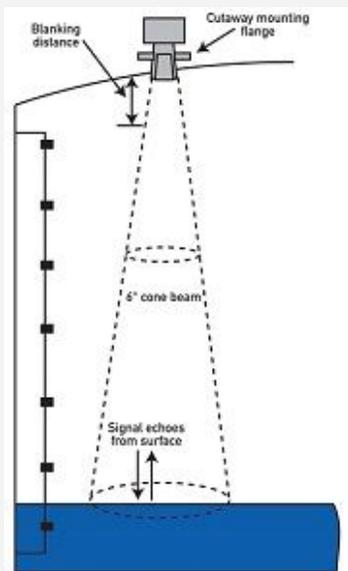
The VoluSense system combines a radar-based level sensor, a communications and power module, and a solar panel to allow oil and gas operators to measure and transmit information about stored fluid in remote locations.

VoluSense gives operators the power to know exactly how much fluid is in a tank, entering a tank, or exiting a tank at any moment. And as always, all this data is available to you anywhere there is an internet connection. This revolutionary technology instantly delivers volume sensing at 1/10th the cost of traditional systems.

And as with all FlowCommand products, no additional equipment or expertise is needed to start bringing an oil field online. VoluSense installs with zero modification needed to existing tanks - simply screw the radar antenna into any standard 2" NPT port on the top of the target tank, mount the solar panel and CPU unit, and all data about the fluid in your tank will be online. There are no extra steps. No external power, telemetry, or SCADA systems are needed. This is made possible by a number of breakthroughs and innovations pioneered by FlowCommand.

TECHNOLOGY INVOLVED

A module transmits radar waves from a send/receive module that is mounted at the top of the tank (and that protrudes approximately 6" into the tank). These waves bounce off of the surface of the fluid inside of the tank.



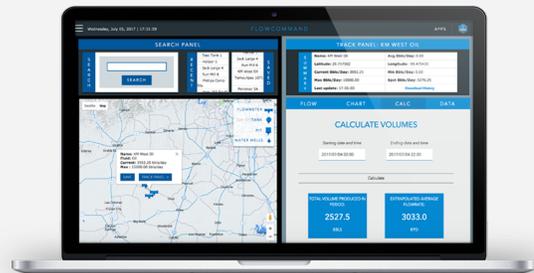
The proprietary onboard processor examines the millions of waves that return to the module, and examines the amount of time each wave takes to return back.

After the device performs complicated filtering logic, the processor algorithmically computes a fluid level inside of the tank or storage container based on the amount of time that certain waves take to bounce off the tank floor, walls, and fluid in the tank.

And as with all FlowCommand sensors, the VoluSense series sensors collect relevant data throughout the operation and sends it to cloud based software via satellite. VoluSense uses algorithms to intelligently and dynamically manage its power system; this system allows the sensor to automatically manage its own power usage and supply merely with a solar panel the size of a tablet.

ADDITIONAL OPTIONS

- VoluSense comes with access to FlowCommand software that will automatically deliver daily reports and customizable alarms to notify recipients when fluid in a tank may be behaving unusually (overflow risk, leaks, etc).



- The CPU module in VoluSense has the capability to read and transmit data from any piece of equipment with a HART or modbus output protocol
- VoluSense can be paired with UltraFlow flow metering solutions to allow operators to monitor their entire field from a computer in the office

TECHNICAL SPECIFICATIONS

SPECIFICATIONS	
ACCURACY	
Measurement type	Proprietary radar based transit-time algorithmic evaluation
Pre-calibration accuracy	± 3% of max range
Repeatability	± 0.25%
Calibration Process	Provide an approximate height of the fluid in the storage tank at the time of calibration using the keypad on the CPU unit
Post-calibration accuracy	± 0.5% of max range
Measurement parameters	Total volume, change in volume
Fluid types	Oil, water, wastewater, chemicals with vapors, condensate - contact FlowCommand for questions about others
Tank height range	12 - 240 ft (4 - 70 m)
TELEMETRY & COMMUNICATION	
Type	Satellite (with GSM bands as available option)
Direction	Uplink and downlink (down accessible only by FC personnel)
Latency	~30s
Frequency	~5 - 100/day standard
Power requirements	None (all supplied by included solar panel)
Inputs	4-20mA, HART, Modbus/RS485, MicroUSB
Outputs	4-20mA, HART, Modbus/RS485, MicroUSB, sat-modem
ELECTRICAL SPECIFICATION	
Battery size	10,000 mAh
Expected operating time (without power)	250 hours
Solar panel peak power	1.5 amps 9 watts
Solar panel peak voltage	6.0 V
Safety mechanism	Intrinsically safe barriers
Radar cable	Up to 500 ft (150m), shielded coaxial pair
Total Number of cable inlets	2
MECHANICAL SPECIFICATIONS	
Components	CPU enclosure, solar panel, radar, cabling, mounting-clamps
Port size	2" NPT
Operating ambient temp range	-28°F to 180°F (-30°C to 80°C)
Mounting style (CPU)	Clamp-on
Dimensions (CPU)	193.80 x 117.60 x 78.49 mm (7.63 x 4.63 x 3.09 in.)
Mounting style (Solar Panel)	Clamp-on

Dimensions (Solar Panel)	220 x 255 x 5mm (8.7 x 10.1 x 0.2 in)
Mounting style (Radar)	Screw-in (2" NPT port required)
Dimensions (Radar)	100 x 450mm (4.0 x 17.6 in)
Antenna material	Teflon
Aggregate weight	7.6 lbs (3.3 kgs)
Enclosure materials	Polycarbonate, aluminum weather-proof, stainless steel
Rating specification	Non-incendive for Class I, Division I, Groups A, B, C & D locations.

FlowCommand Inc.

10606 Hempstead Rd Suite 112

Houston, TX 77092

T +1 775 773 5692

T +1 713 714 5547

sales@flowcommand.com

www.flowcommand.com

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