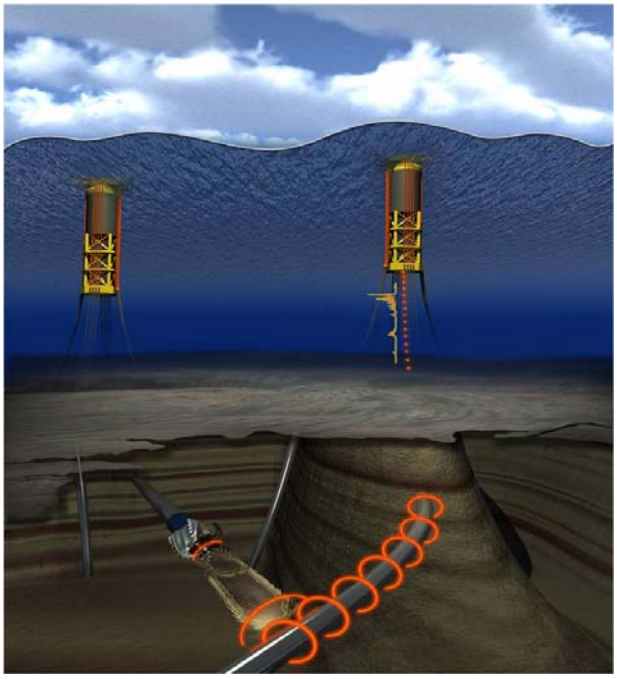
ClampOn DSP Well Collision Detector

The ClampOn DSP Well Collision Detector is designed to prevent collisions involving directional drilling within the proximity of existing wells. ClampOn DSP Well Collision Detectors provide operators with real time data so that collision risk analysis calculations are not the only factor determining the bit's proximity to existing wells.



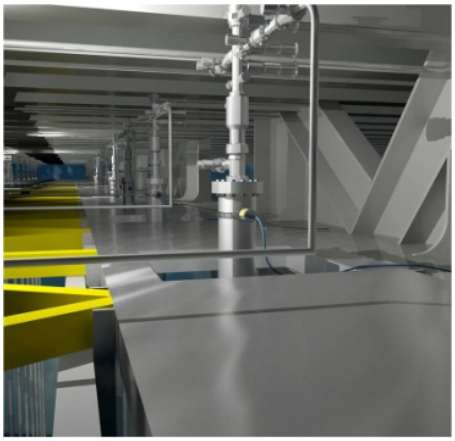
This method uses ClampOn non-invasive ultrasonic sensor technology in the form of a spectrum analyzer. The spectrum analyzer digitizes the ultrasound allowing frequency analysis in real-time. The procedure is patent pending.

The process involves ClampOn DSP Well Collision Detectors being installed topside on all existing wells in close proximity to the well being drilled. The drill string's approach to existing wells will create an increase in the ultrasonic signal being observed topside. When dramatic ultrasonic increases are observed, drilling will be halted and data analyzed. After analysis is complete, the drill string can be diverted or drilling can resume with the confidence that a collision has been avoided or that initial calculations were confirmed.

The use of directional drilling is only going to increase as fields mature. Proper collision avoidance techniques should be considered when preparing for the drilling operations. The ClampOn DSP Well Collision Detector provides the operator with an advanced real time collision monitoring system with minimal equipment and personnel requirements.

Procedure Goals

- Prevent drill bit from colliding with existing well casing during directional drilling operations
- Give engineers physical proof of drill strings proximity to existing wells
- Prevent environmental damages caused by collisions
- Help to increase safe drilling speed and decrease downtime caused by collisions



Installation

- Easy non-invasive installation of hardware
- No hot work permit required
- Intrinsically safe sensors
- No need for production shut-down to install
- Minimal impact to daily operations on the platform
- Mounted on conductor pipe

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DSP Well Collision Detector

Instrument Datasheet

ULTRASONIC INTELLIGENT SENSORS

INSTRUMENT DATA

GENERAL

			NOTE
1.0	Manufacturer	ClampOn AS	
1.1	Model description	DSP well collision detector, Ex ia	
1.2	Part number	930-1xx1x-xxx	1

CLIENT DATA

2.0	Customer	
2.1	Project title	
2.2	Field / installation	
2.3	P.O. number	
2.4	Part number	
2.5	Tag number	
2.6	Document number / rev.	

PHYSICAL

3.0	Dimensions (ø x h)	80 mm x 144 mm [3.1 in x 5.7 in]	
3.1	Material	AISI 316 Stainless Steel	
3.2	Weight	Approximate 3 kg [6.6 lb]	2
3.3	Ingress protection	IP68	
3.4	Operating temperature	-40 °C to 150 °C [-40 °F to 302 °F]	3, 4
3.5	Ambient temperature	-40 °C to 60 °C [-40 °F to 140 °F]	
3.6	Protective coating	None	
3.7	Mounting	Clamp on to pipe surface	5
3.8	Cable entry	1 off M20 x 1.5 ISO Metric	6
3.9	Cable	None	7

HARDWARE AND CERTIFICATION

4.0	Supply voltage	12 VDC to 25 VDC (from I.S PSU)	8
4.1	Power consumption	Typical / max: 1.5 W / 2.1 W	
4.2	Hazardous area	Zone 0, 1, 2	
4.3	Certification code	EEx ia IIB T2-T5	3, 9
4.4	Equipment code	Ex II 1 G	
4.5	Ex certificate number	DNV-99-ATEX-1004X	9
4.6	Signal output	RS-485	
4.7	RS-485 protocol	Proprietary DSP	
4.8	RS-485 baud rate	38 400 baud	10
4.9	Microprocessor	66 MIPS	
4.10	Memory	4 Mb onboard flash	
4.11	Diagnostic features	Self-testing	11

OPERATION

5.0	Manner of operation	Real-time measurement
5.1	Technology	Passive ultrasonic
5.2	Processing	DSP in sensor unit
5.3	Uncertainty	±5 %
5.4	Repeatability	Better than 1 %
5.5	Flow conditions	Oil / water / gas / multiphase
5.6	Frequency range	0 Hz to 1 MHz
5.7	Refresh rate	Once every second
5.8	MTBF	>30 years

Number of cable entries and size, enclosure material, and cable/cable gland type adaption's available on request. Ask supplier for details.

INSTRUMENT LAYOUT

NOTES

1 X notation subject to change according to cable type / length, cable entry interface, and coating.

2 Weight including mounting accessories.

3 ATEX-certified for pipe surface temperature up to 225 °C [437 °F].Temperature class depends on pipe surface temperature. See certificate for details.

4 Operating temperature stated for 15 °C [59 °F] ambient temperature.

5 Delivered with mounting skid and clamping bands. Clamping band length 2 meters [78.7 in], covering pipe OD <610 mm [24 in]. It's recommended to use square skid with pipe OD >254 mm [10 in].
Extension clamping band for pipe OD >610 mm [24 in] and / or square skid, ask supplier for details.
For installation of the sensor there must be a minimum of 30 cm [12 in] free space around the pipe. Sensor front must have metal to metal contact with the pipe surface. See installation instructions for further details.

6 Fitted with M20 stopping plug.

7 Terminals inside sensor enclosure suitable for wire cross section 0.14 mm^2 to 1.5 mm^2 [AWG 25 to 16].

8 According to ATEX-certificate the sensor has to be powered from an intrinsically safe power supply. Use only I.S power supply supplied or approved by ClampOn.

9 Additional certification available, CSAc&us or Inmetro;
- CSAc&us
  Certification code: Class 1 Div 1, Group C & D, T5
  Ex certificate no.: 1298002
  See certificate for details.
- Inmetro
  Certification code: BR-Ex ia IIB T2-T5 IP68
  Ex certificate no.: MC, AEX-6763-X
  See certificate for details.

10 Baud rate range (can be programmed):
- 9 600 baud to 57 600 baud

11 Internal self-testing of analogue filters, amplifiers and flash memory.

SYSTEM DESIGN

ClampOn DSP Well Collision Detector, Ex ia version (also available in Ex de version), is designed to prevent collisions involving sidetrack drilling within the proximity of existing wells. The sensor provides operators with real time data so that collision risk analysis calculations are not the only factor determining the bit's proximity to existing wells. It is non-intrusive and clamped on the pipe surface; hence no parts are in contact with the flow. All ClampOn topside sensors have two-way communication via RS-485, can be upgraded / customized by software download, contain no moving parts and are easy to relocate. An optional computer running ClampOn software can be used to handle data storage and communication to client control system.