

FLEXASSURE™

Flexible Riser Monitoring System



INTEGRIPod™



The **FLEXASSURE™** flexible riser monitoring system is used to confirm the integrity of the top section of flexible risers by detecting the events of tension wire rupture and measuring its top angle (tension) and motion.

This allows the difference in measurements across the bend stiffener to be determined. The two pods are hardwired to a topside data acquisition system. The system may be optionally interfaced to the global positioning system and satellite communication system. Software combines the signals from all the sensors and processes the data using algorithms developed by 2H to detect anomalies, armor wire rupture, VIV, excessive tension and presence of dangerous gases in the I-tube.

SYSTEM DESCRIPTION

On each riser, a diver installable **INTEGRIPod™** is mounted below the bellmouth of the I-tube. The pod measures continuously motion, top angle and acoustic emission during armor wire rupture.

A second **INTEGRIPod™** is mounted on the riser flange that is rigidly connected to the vessel structure. It measures motion and acoustic emission.

OPTIONS

- Motion sensor to detect VIV
- Connect to GPS for position
- Sensors installed to detect various gas content in the I-tube and on the riser vent valve (optional)



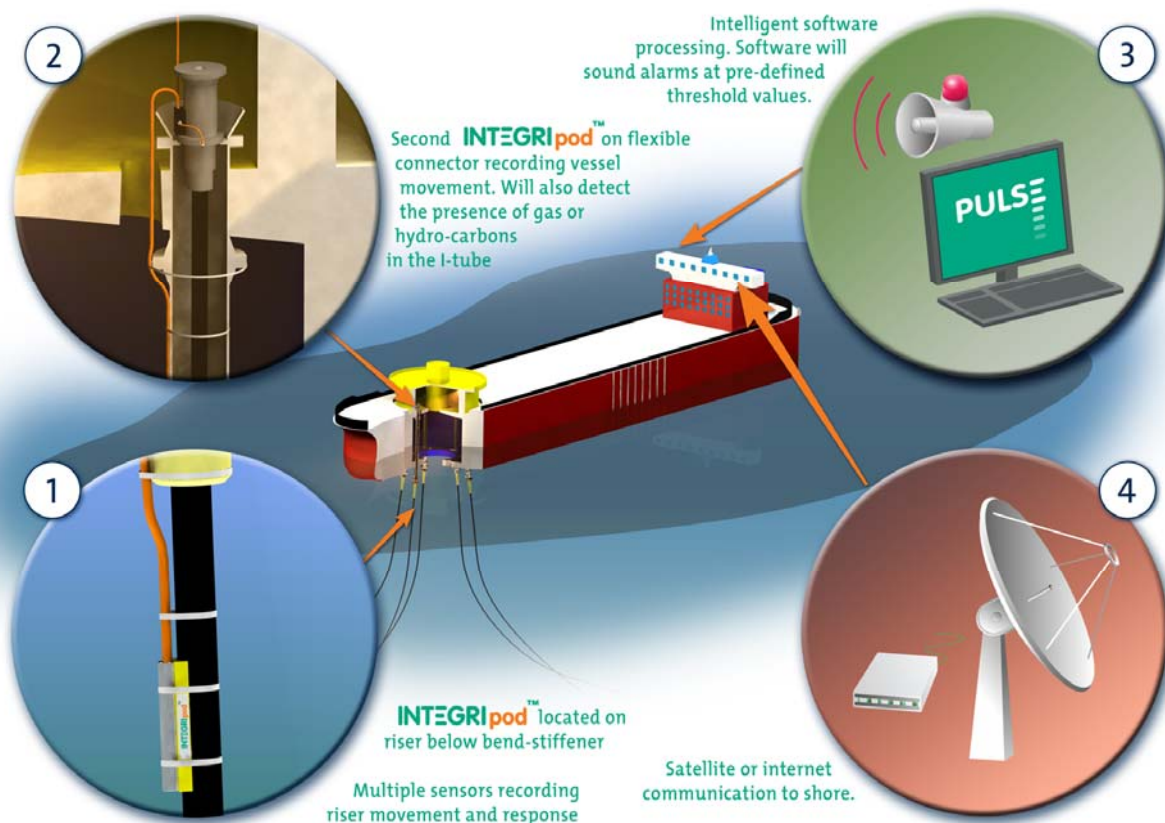
FLEXASSURE™ lower pod attached to the riser below the bend stiffener



FLEXASSURE™ software screenshot

FEATURES

- Detects armor wire rupture events
- Detects anomalies that accelerate degradation such as vibrations and excessive angular deflections
- Provides essential data to infer that riser response follows predictions.
- Eliminates unnecessary maintenance and improves efficiency of inspection
- In extreme cases, detects progressive structural failure allowing emergency shut-down to reduce safety hazards and prevent environmental damage



SYSTEM CONFIGURATION

The two INTEGRIPods™ are hardwired to a topside data acquisition system. The system may be optionally interfaced to the global positioning system and satellite communication system. Software combines the signals from all the sensors and processes the data using algorithms developed by Pulse to detect anomalies, armor wire rupture, VIV, excessive tension and presence of dangerous gases in the I-tube. If the measured parameters are over the preset threshold, alarms are initialized. The data recorded on the vessel is stored in a database which can be accessed by Pulse engineers to periodically review and prepare monthly reports on key operational events and long-term trends.

SPECIFICATIONS

Items	Description
Sensor types in INTEGRIPods	Tri-axial acceleration sensor, 1-D angular rate sensor and microphone
Measurement resolution	Acceleration: 2mg RMS, Inclination: 0.1 deg RMS, Angular rate sensor: 0.05 deg/s RMS, Temperature: 0.5 °C
Data link	RS422/RS485 twisted pair
Diver serviceable lower pod	Yes
Holders for pods	Tailored mechanical interface to suit client need
Electrical system	50 m of subsea cable for lower INTEGRIPod per riser 100 m of topside electrical cable per riser Topside data acquisition system (industrial PC) with User specified software
Logging and data downloading program	Sampling rate: 1 and 2 kHz (2 kHz default) Calculation period: 0.5 sec Data generated: RMS, average and peak-to-peak for all sensor readings
Dimension	Lower pod: 60 mm outside diameter and 0.4 m length Upper pod: 300 mm x 300 mm x 300 mm
Weight	Lower pod: 10 kg in air, Upper pod: 4 kg in air



London
1-7 Cherry Street
Surrey, GU21 6EE, UK
Tel: +44 1483 774910

Aberdeen
Tern Place House, Tern Place,
Bridge of Don
Aberdeen, AB23 8JX, UK
Tel: +44 1224 452285

Houston
16000 Barkers Point Lane, Suite 120,
Houston, TX 77079, USA
Tel: +1 713 422 2663

Kuala Lumpur
Suite 16-3, 16th Floor, Wisma UOA II
21 Jalan Panang 50450
Kuala Lumpur, Malaysia
Tel: +60 1 2328 312

Rio de Janeiro
Praça Floriano, 19-22º andar,
Centro, RJ, 20031-924, Brazil
Tel: +55 21 2510 7323