

Pendulous Installation Method Report of the Full Scale Offshore Test

Authors:

Pedro Felipe Katrein Stock

Petrobras E&P

José Américo Ney Ferreira

Petrobras E&P

João Luis Batista da Silva

Petrobras ENGENHARIA

Rogério Diniz Machado

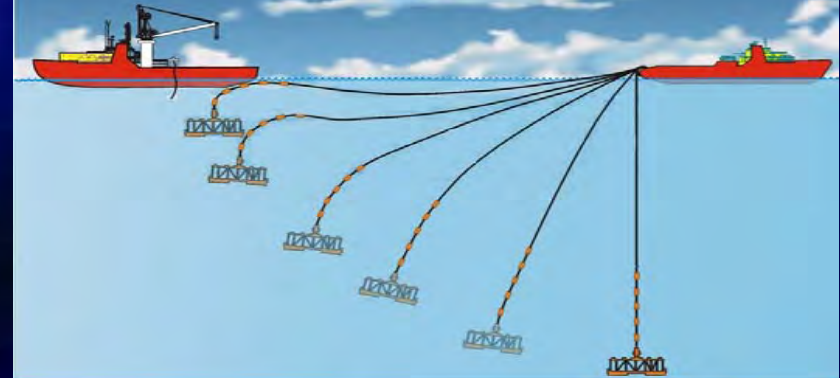
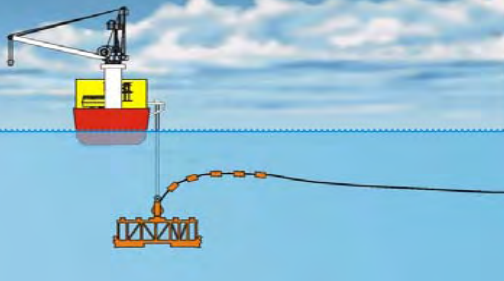
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Full Scale Offshore Test – 1900 m WD

- **PENDULOUS METHOD**
- **DUMMY MANIFOLD**
- **LAUNCHING LINES**
- **VESSELS POSITION and CONTROL**
- **OPERATION**
- **CONCLUSION**

27 12 2005

Pendulous method



Dummy manifold



- Model of the MSGL-RO-2
- Weight : 280 tons
- Dimensions : 16.6 x 8.5 x 5.2 m

Dummy manifold instruments

- Measurement of position and motion



Gyro Compass

Coordinates

Transponder 1

Support Vessel

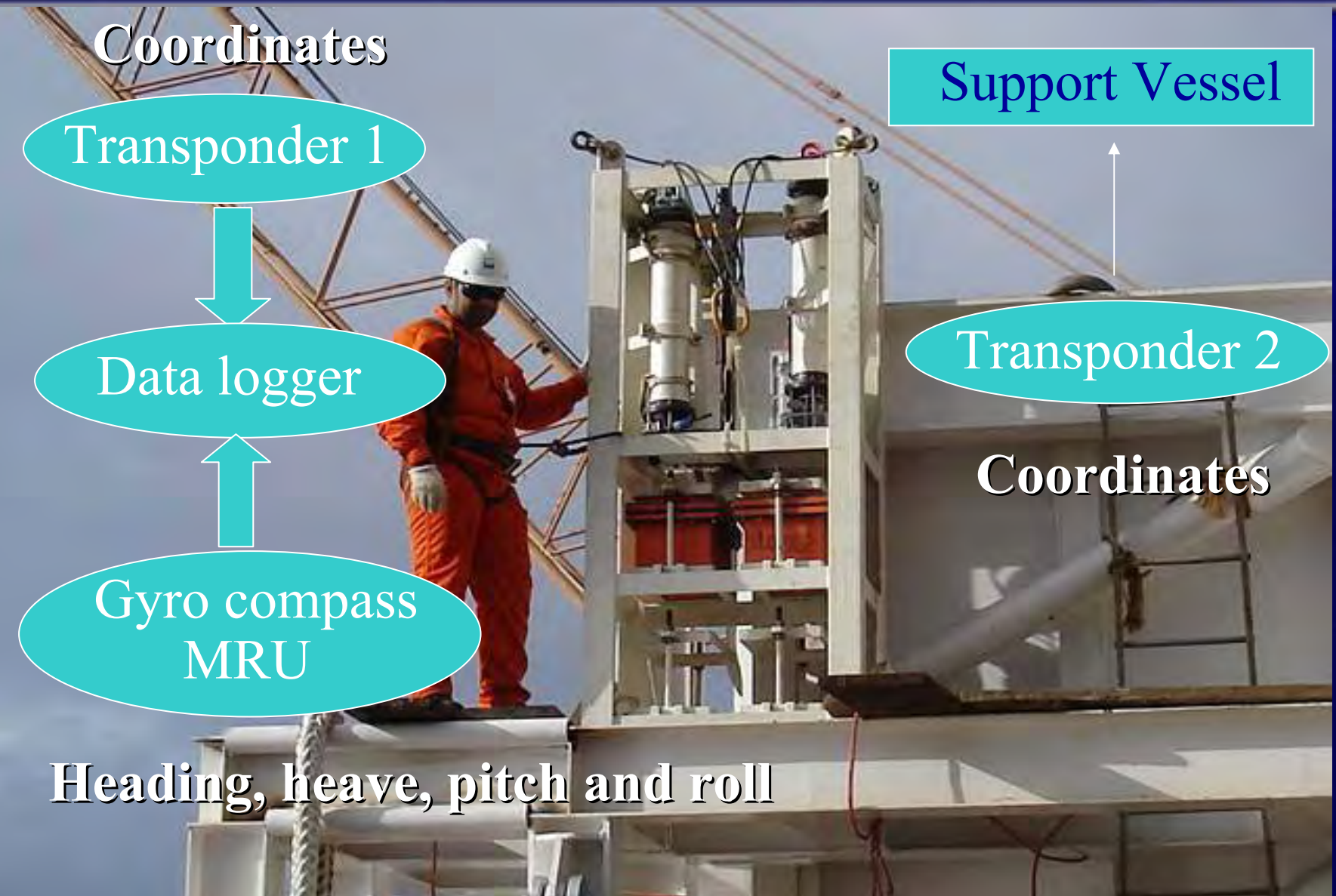
Data logger

Transponder 2

Gyro compass
MRU

Coordinates

Heading, heave, pitch and roll



Inertial Measurement Unit

Altitude

Coordinates

GPS

Data Logger

Pressure Sensor

Pressure

Inertial Measurement Unit

Linear and angular accelerations

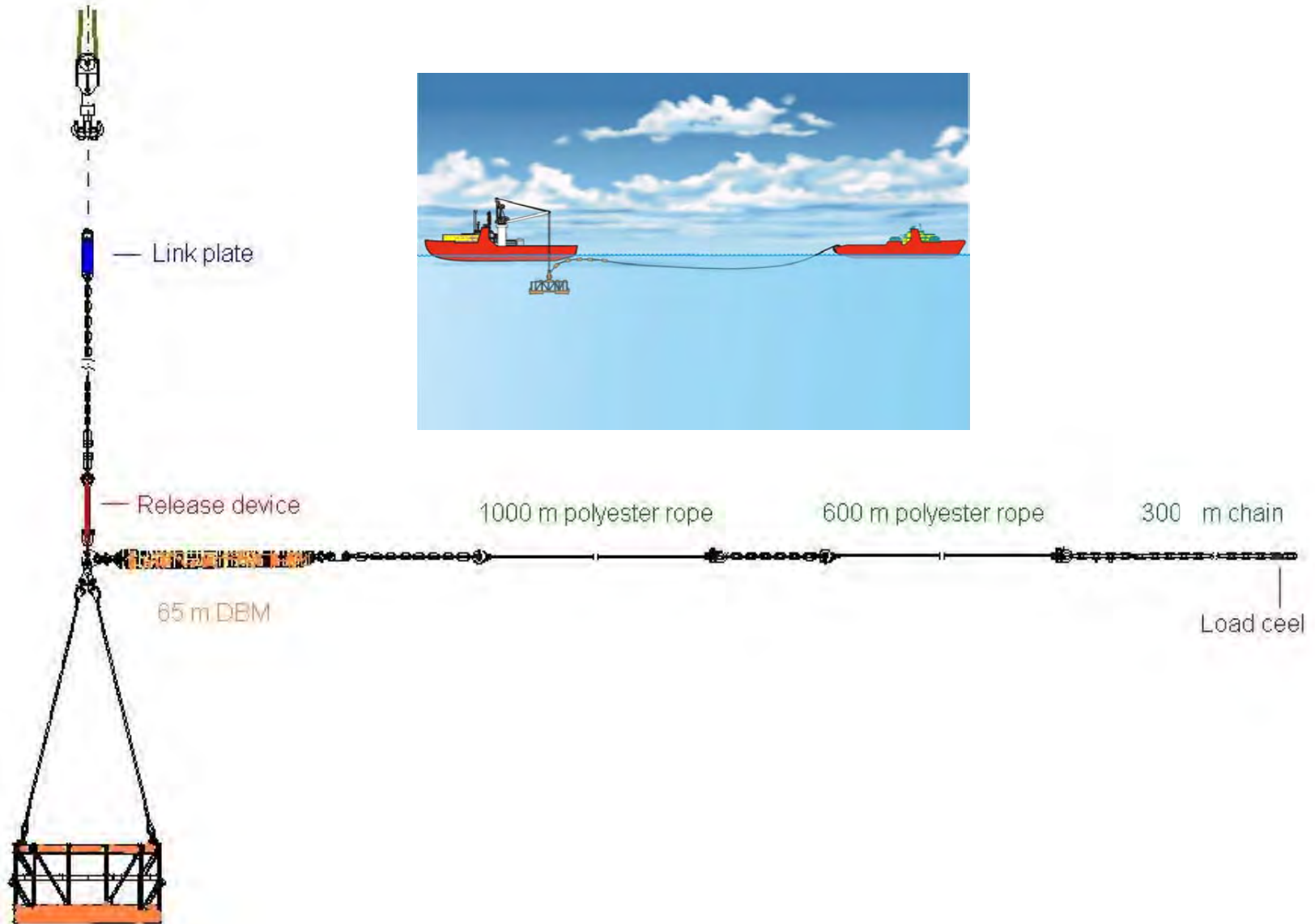
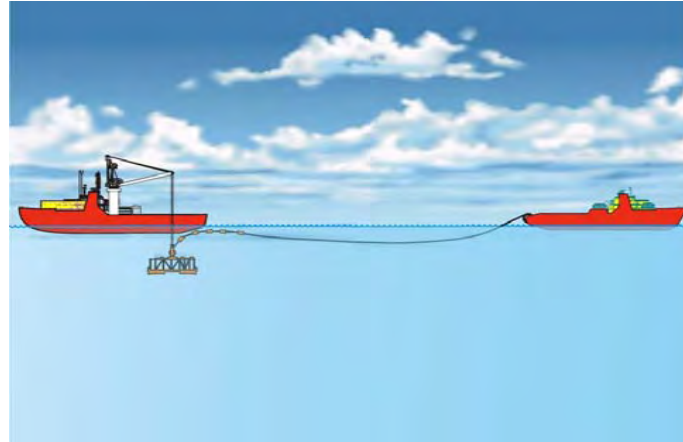


Subsea Control Module

- Electric and hydraulic Subsea Control Module
- Accelerometer + Data Logger
- MSGL – RO – 02



Launching Lines

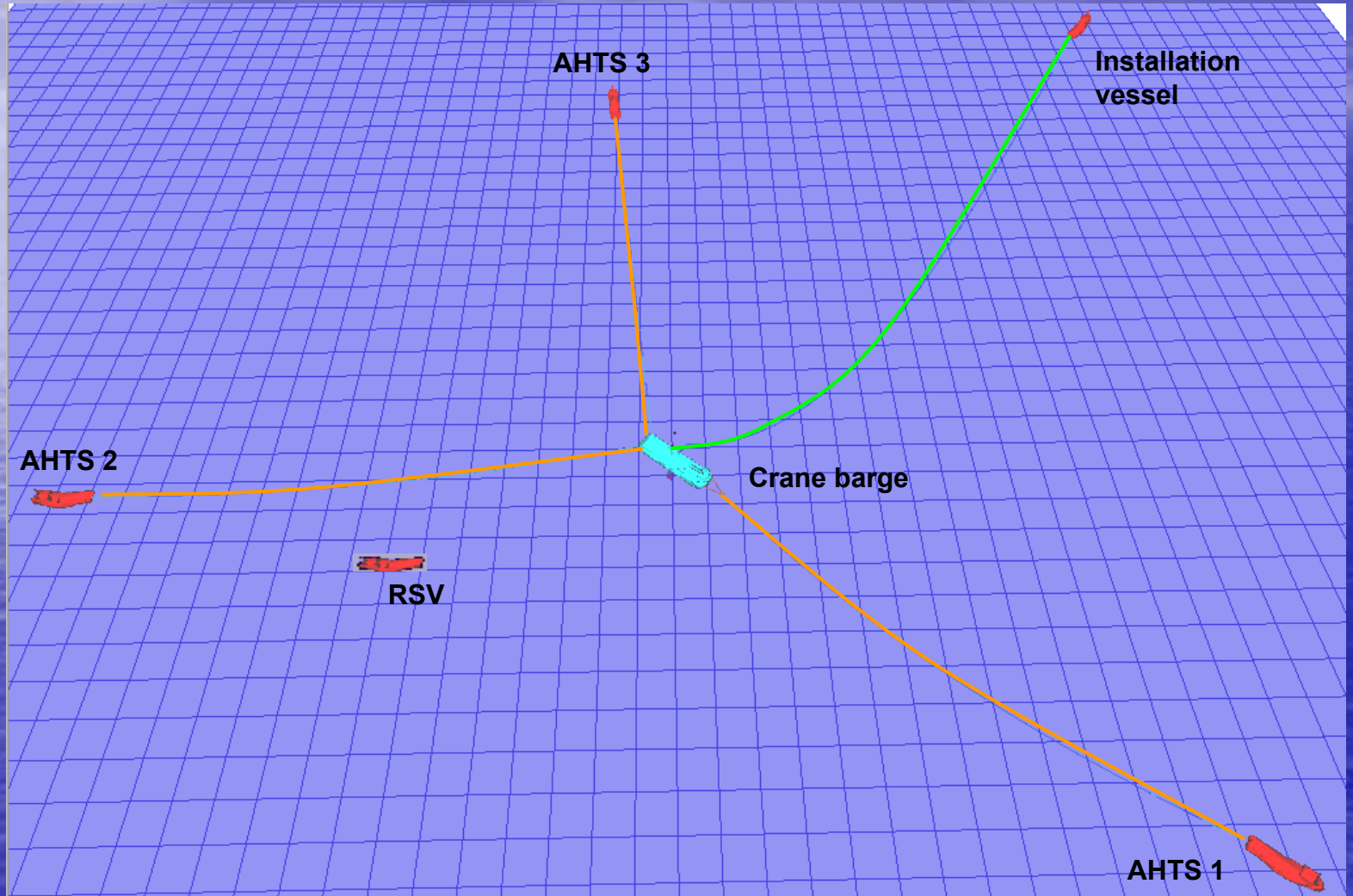


Release Device and Link Plate

- Polyester Rope
- Cutting Tool : Wire rope



Vessels position



Vessels position control

BGL-1 Dummy Manifold - Survey 1 - HYDROpro Construction (Survey)

Project View Configure Survey Map Display Help

Dummy (Frame ...)

Alvo	Dummy projeto
Distância	1996,89 m
Azimute	129,75°
Norte	7588274,00 m
Este	428384,00 m
Aproamento	0,26°

BGL-1 (Frame ...)

Alvo	Antena GPS
Distancia	0,06 m
Azimute	50,87°
Norte Turret	7588260,96 m
Este Turret	428336,96 m
Aproamento	219,12°
Solução	Not available

Plan View Map (Frame : Geral)

M. Boulder (Fra...)

Alvo	M. Boulder projeto
Distancia	0,00 m
Azimute	0,26°
Norte Popa	7587898,00 m
Este Popa	428052,00 m
Aproamento	219,12°
Solução	Differential

F. Santana (Fr...)

Referência	F. Santana p/ Skid
Distancia	101,90 m
Alvo	F. Santana projeto
Distancia	1300,03 m
Azimute	129,50°
Norte Popa	7588210,41 m
Este Popa	428461,17 m
Aproamento	129,82°
Solução	Differential

M. Clipper (Fram...)

Alvo	M. Clipper projeto
Distancia	0,00 m
Azimute	0,26°
Norte Popa	7588339,00 m
Este Popa	428807,00 m
Aproamento	84,12°
Solução	Differential

M. Cutter (Fra...)

Alvo	M. Cutter projeto
Distancia	0,00 m
Azimute	0,26°
Norte Popa	7588721,00 m
Este Popa	428347,00 m
Aproamento	354,12°
Solução	Differential

N. Borg (Frame : ...)

Alvo	N. Borg projeto
Distancia	55,82 m
Azimute	226,17°
Norte Popa	7588112,84 m
Este Popa	428340,10 m
Aproamento	220,00°
Solução	Differential

ROV (Frame : G...)

Alvo	ROV projeto
Distancia	0,00 m
Azimute	0,26°
Norte	7588200,00 m
Este	428380,00 m

For Help, press F1

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Crane Barge

- 1000 tons Crane
- Mobile Deck Crane
- Hang off Support

- MRU
- GPS
- Gyro Compass



Installation Vessel

- AHTS DP
- Installation Line
- MRU



ROV Support Vessel



- ROV
- Video Link
- Hydraulic Cutting Tool

Operation - Transport



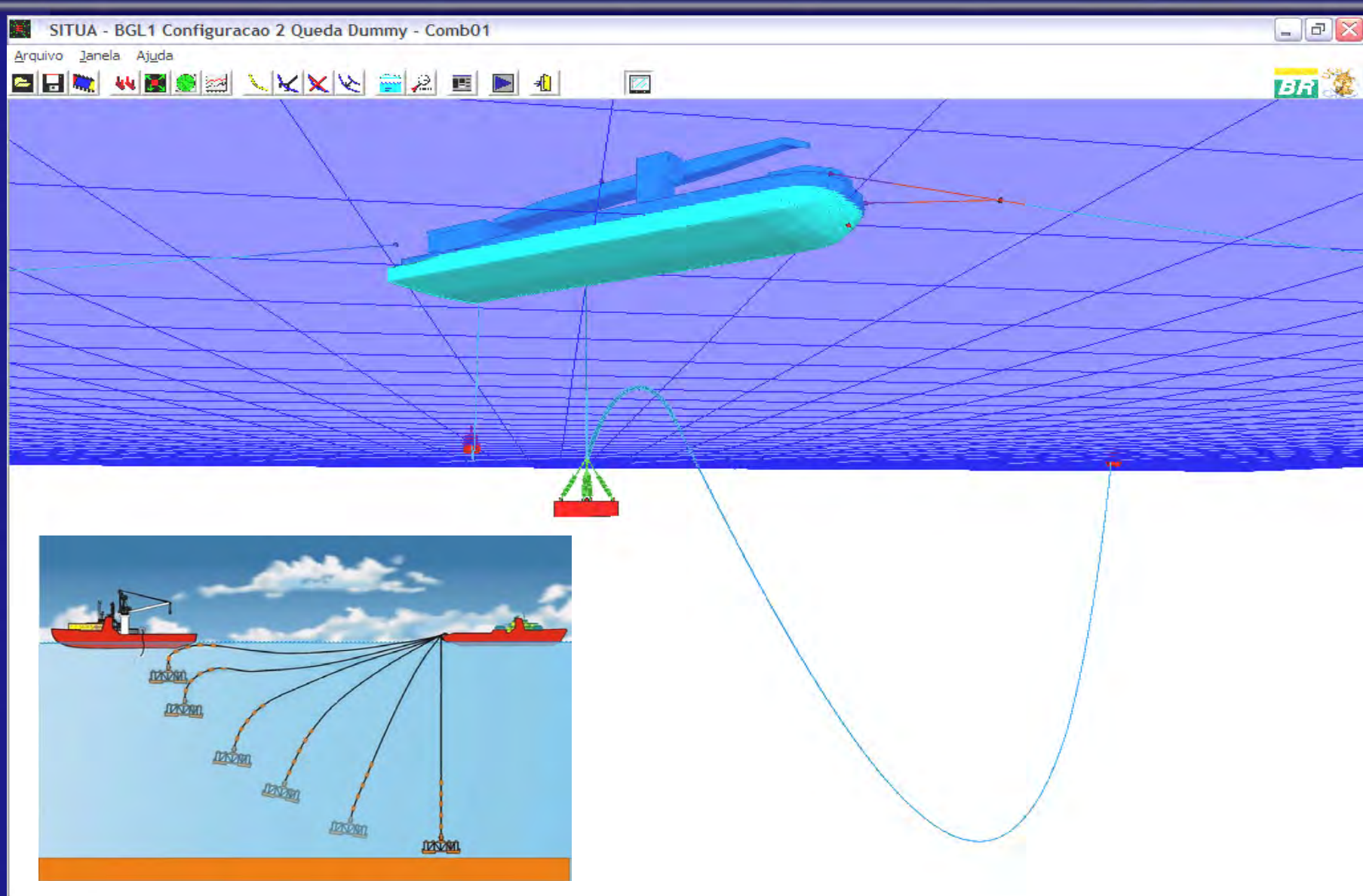
Operation – Over boarding



Operation – Hang off



Operation - Release



DUMMY MANIFOLD MOVIE



- Pendulous installation procedure: Easy and safe operations
Improvement : Buoyancy modules will be transported on the installation vessel.
- Good comparison between numerical analysis and model tests x full scale test qualified the technology.

