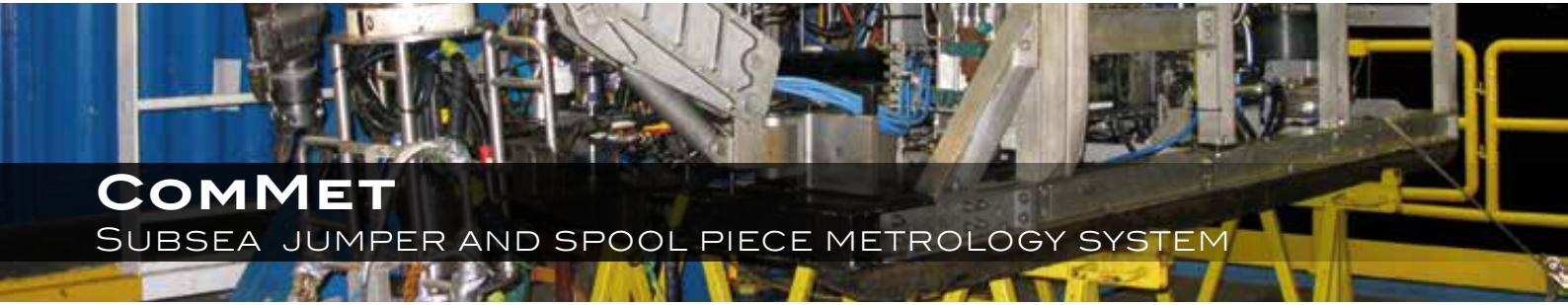
ComMet

Subsea jumper and spool piece metrology system

iXblue
DEEP INSIGHT. SHARPER SENSES.



ComMet

Subsea jumper and spool piece metrology system

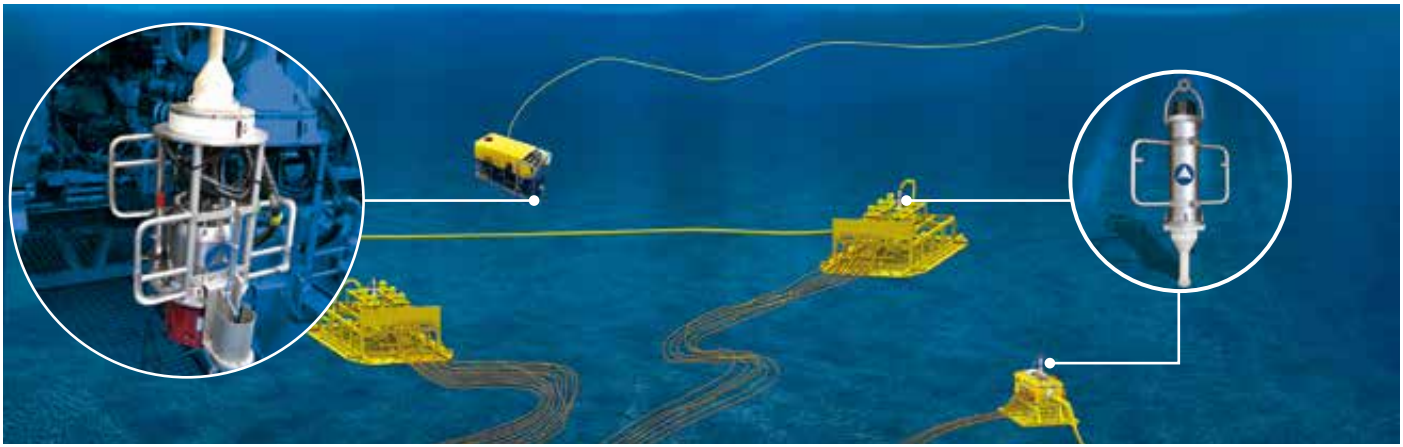
ComMet is designed to acquire accurate and traceable dimensional measurements of subsea structures, generally used in the design and production of interconnections between those structures.
With **ComMet** iXBlue has introduced a new method combining acoustic and inertial technology allowing rapid efficient collection of data whilst maintaining accuracy and robustness of the measurements.

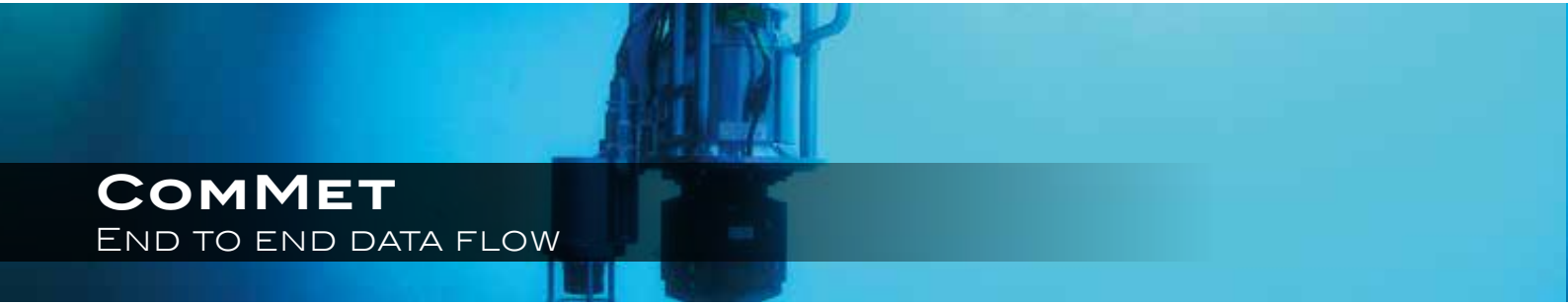
FEATURES

- A two stage process is used to measure the distance between two beacons installed in the connectors and then to measure the attitude and heading of each connector
- Using the SLAM Technique, thousands of acoustic measurements are combined with the best commercially available inertial measurements. Metrologies no longer need to be line of sight in order to be completed quickly
- The SLAM approach can even conduct multiple metrologies simultaneously, tying a number of structures together in a single ROV dive
- Redundant processing using multiple techniques leads to a robust solution with extensive QA/QC data presented in a ready to use report format

BENEFITS

- Saves time: equipment inventory and time to complete are drastically reduced with no compromise on accuracy
- Robust and reliable: no line of sight required for acoustics, tolerant to masking
- Simple: a ready-to-use metrology tool
- Versatile: sub-components are available for general navigation purposes





ComMet

End to end data flow

The **ComMet** system not only consists of the hardware required for metrology operations, but also all the software and procedures required to perform the operation and turn the raw measurements into a fully formatted report.
ComMet integrates a number of **iXBlue** subsea positioning building blocks into a seamless end to end solution. Not only does **ComMet** provide the tools to gather the metrology data, but a comprehensive procedure and software package takes the user from start to finish in simple straightforward steps.

PHINS

First introduced to the commercial survey market in 2001, **PHINS** is a high grade Inertial Navigation System. Coupled with a Doppler Velocity Log, **PHINS** is a standard tool for high accuracy Remotely Operated Vehicle positioning.

RAMSES

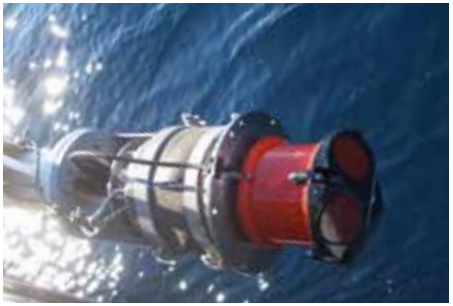
The newest building block within the **iXBlue** portfolio of subsea products, **RAMSES** is an intelligent range meter. Closely coupled with the **PHINS**, range measurements to transponders are combined with inertial data from the INS. Algorithms precisely determine the location of the transponders while simultaneously using the ranges to the transponders in order to aid the inertial solution.

Transponders

Building on the long history of **OCEANO** and **iXBlue**'s extremely robust range of acoustic releases, the **ComMet** system uses **iXBlue**'s **ET962** acoustic beacons.

Ancillary sensors

Sound velocity, pressure and tidal sensors are all integrated into the **ComMet** system allowing for rapid mobilisation with minimal operator intervention. A DVL is installed at one end of the tool and is used during range measurements. For connector angle measurements, a stab connector may be attached to the other end of the tool.

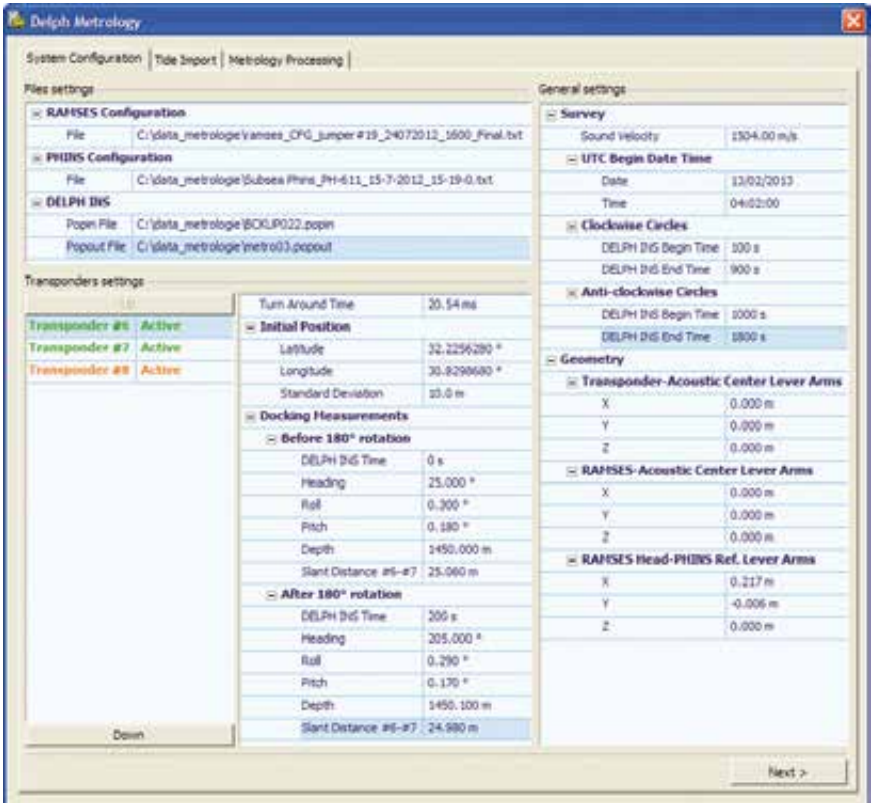


ComMet
Data Processing

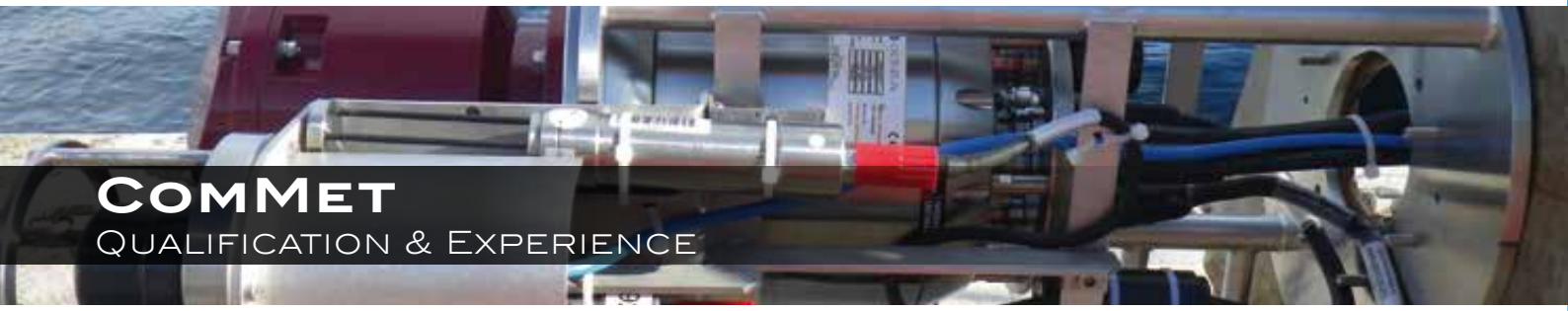
Based on iXBlue's innovative **DELPH INS** post processing software, **ComMet** adds a dedicated module for metrology post-processing. **ComMet** forms a seamless integrated data processing path, the surveyor simply has to select the logged file and enter some basic parameters before launching the process and obtaining the final results.

DELPH INS allows the detailed examination of all data gathered for data consistency and correct operation of sensors.

ComMet uses a SLAM (Simultaneous Localisation And Mapping) algorithm to calculate the results of the metrology. Alternate processing techniques, some using pure acoustic, and some using pure inertial are then compared to the SLAM results for confirmation.



The **ComMet** metrology software reports the length and orientation of the spool as well as the orientation of each end connector, everything required to manufacture a spool or jumper is presented along with extensive statistics on the quality of the raw measurements and calculated results.



ComMet
Qualification & Experience

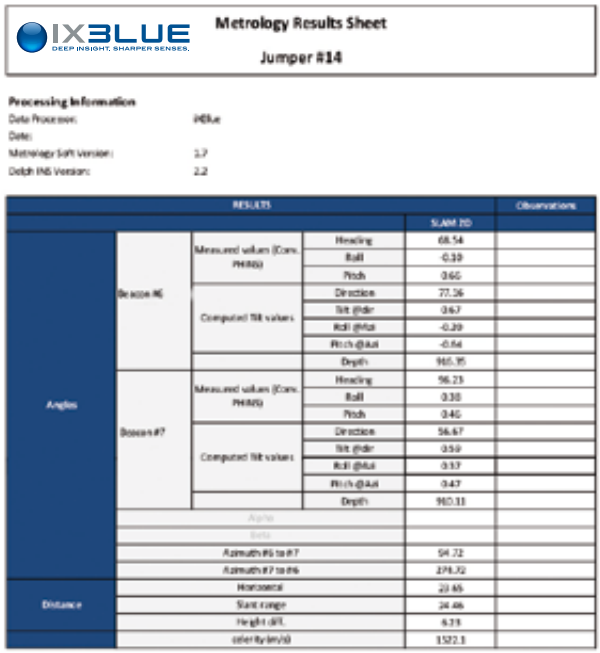
ComMet has been through an extensive process of testing and qualification*, from initial testing conducted in shallow water compared to diver operated taut wire, to deep water West Africa comparing ROV deployed **ComMet** to traditional Long BaseLine techniques, the system has proven to be a speedy and reliable solution for metrology operations.

Multiple Metrologies in one operation.
The **ComMet** system is able to position up to 14 beacons simultaneously, meaning that in one operation up to 7 individual spools may be measured.

- **Accuracy independent of spool length**.
  The advanced techniques used within the **ComMet** system work together to eliminate errors from sound velocity variations, refraction, reflections and external noise. Accuracy is independent from the length of the measurement.

- **Line of sight not required.**
  It is not necessary to have acoustic line of sight between each end of the metrology.

Testing has proven that the **ComMet** system is able to produce results at least as good as existing techniques in vastly reduced timescales. A single ROV dive is all that is required, even for the most complex of metrology operations.



IXBLUE
DEEP INSIGHT, SHARPER SENSES.

Metrology Results Sheet

Jumper #14

Processing Information

Data Processor:	HBlue
Date:	
Metrology Soft Version:	1.7
Delph INS Version:	2.2

RESULTS					Observations
				SLAM 2D	
Angles	Beacon #6	Measured values (Cons. PHINS)	Heading	68.54	
			Roll	-0.39	
			Pitch	0.65	
		Computed Tilt values	Direction	77.36	
			Tilt @dir	0.67	
			Roll @Aut	-0.39	
			Pitch @Aut	-0.64	
			Depth	965.95	
	Beacon #7	Measured values (Cons. PHINS)	Heading	56.23	
			Roll	0.30	
			Pitch	0.45	
		Computed Tilt values	Direction	56.67	
			Tilt @dir	0.59	
			Roll @Aut	0.37	
			Pitch @Aut	0.47	
			Depth	960.31	
	Alpha				
	Beta				
	Azimuth #6 to #7			54.72	
	Azimuth #7 to #6			234.72	
Distance	Horizontal			23.65	
	Slant range			24.46	
	Height diff.			6.31	
	Ideal Baseline			1322.1	

** Full qualification process conducted in cooperation with Saipem.*

Eni Saipem

EMEA: +33 1 30 08 88 88 • AMERICAS: +1 781 937 8800 • APAC: +65 6747 4912

www.ixblue.com

IXBLUE

DEEP INSIGHT. SHARPER SENSES.

2013-02-BR-COMMET