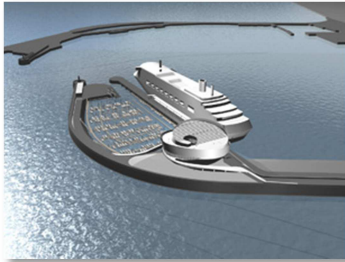# PRODIVING ®

Introduction

About ISPTEL

ISPTEL is strategically located north of Porto, the second major city in Portugal nearby Leixões harbour, where offshore activities are exponentially increasing.

ISPTEL initiated its activity in 1998. In order to provide solutions to our customer's demands we have created a multidisciplinary team in the area of the Electronic System Development and Maintenance.

Since the introduction of our first DVD diving recording unit in 2000, we have been committed in developing reliable, easy to use and high performance video processing units for Diving Operations. Applications for these units are found in offshore diving activities, conducting harbour inspections or just for Bore Hole and Pipe inspection.
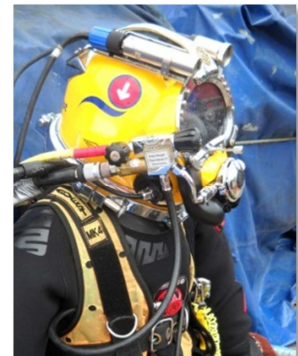
ProDiving ® Computer Based Diving Monitoring System

Why ProDiving is Innovative?

The Diving Supervisor tasks are complex. Not only he needs the knowledge on diving procedures and application of the right diving table for a specific depth and bottom time, he also has to register all diving data, the work to be done by the diver, as well as the frequency of the diving.

Although it is common industry practice for offshore diving, to rely on handwritten records of diving operations and decompression in a hyperbaric chamber, we have to rely completely on the integrity, quality and capacity of the human element to respond timely to all data input, without errors and simultaneously monitor all operations on deck. Our company has developed an Integrated Diving Management System - PRODIVING. It records the time, depth and water temperature for to two divers, including the rate of ascent and descent. It also has the capability to calculate, in real time, the diving decompression stages and warnings.

It also has the ability to record images and sound and can still make the webcast of the entire diving operation, for any place on earth. Produces all diving reports automatically in accordance with the standards and recommendations of various entities (IMCA, HSE, NORSOK among others).

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CAPITAL SOCIAL 57.000 EUR MATRICULADA NA CRC DO PORTO SOB O Nº PT 504 104 039

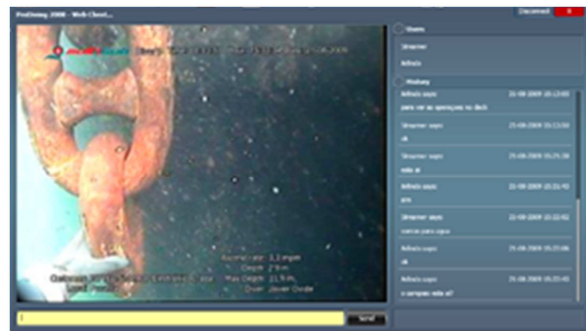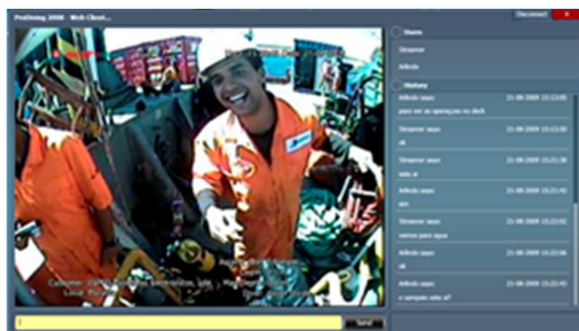TEL. +351 22 999 9620 FAX. +351 22 996 0470

The most important and innovative aspect of the ProDiving® is the Video Processing and Recording unique technique. Using the Microsoft® DirectShow® application programming interface (API), and DirectX® to produce a multimedia file, including two video sources, two audio sources, overlay text and company logo. The final result is one DivX® multimedia file, divided in chapters with all information on it such as:
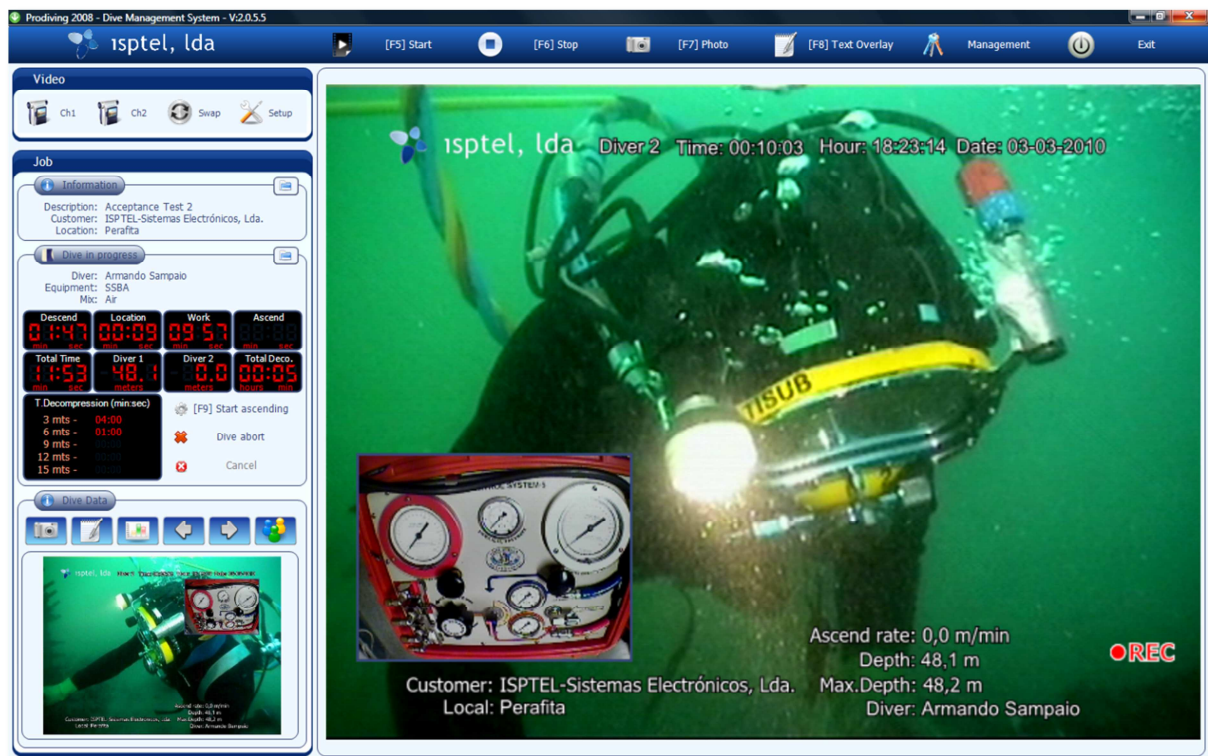
- ✓ Video Channel 1 – Picture from Main Diver Camera or ROV Camera;
- ✓ Video Channel 2 – Picture from Standby Diver Camera or ROV Camera;
- ✓ Channel 1 and 2 can be swapped from main screen to Picture in Picture screen (PIP);
- ✓ PIP screen can be moved around the screen with a simple mouse move;
- ✓ The overlay text has fully configurable layout, using mouse in WYSIWYG mode, able to display any international characters set from Windows® Operative System;
- ✓ Real time data is displayed in the left side of the monitor, giving details about the dive such as:
- ✓ Maximum depth;
- ✓ Actual depth;
- ✓ Time display of all steps of the dive;
- ✓ Decompression step level and time to be accomplished when start ascending;
- ✓ Water temperature;
- ✓ Ascending rate.

By mean of Local Web Server, we are able to send video and multimedia contents over the internet in real-time.

Reports and Graphs

A Daily Report is automatically generated at the end of each working day. A Diving Profile Chart is also generated for each dive done, based on real time data acquired, which contains all the information needed for any Hyperbaric Treatment in surface decompression or, in the worst case, if a diving accident occurs.

Benefits to our Customers

Today offshore operations require personnel safety as well as diving and operations reports. All data included must be very precise and delivered to Operations Managers, just in time.

The ProDiving system and Digital Video techniques offers certain distinct advantages over old VHS technology:

- ✓ Reduce the diving decompression accident risk in Repetitive Dive;
- ✓ Immediate access to video clips using a desktop or laptop PC;
- ✓ Instant remote access to video clips, still pictures and reports over Internet;
- ✓ Automatic and rapid generation of indexed reports containing video stills and clips;
- ✓ Simple and easy distribution of video data to other users via CD/DVD or electronic means (Pen Disk, Multimedia Cards);
- ✓ Very significant reduction in the volume of the video archive;
- ✓ Significant reduction in the number of media required to store the video archive;
- ✓ Instant access to any part of the survey video;
- ✓ Enhanced access to information using databases linked to indexed video information;
- ✓ Daily operations reports in PDF format;
- ✓ Per Dive basis Diving Profile Reports;
- ✓ All information stays under customer control, even the when Diving team or Diving Company changes, all movies, pictures and reports are stored in this unit.

Technologies and Know-How

Using common components with proven reliability such as;

- ✓ Industrial Personal Computers based on Intel® CPU / Chipset,
- ✓ Microsoft Windows Vista® Operative Systems makes this unit easy to maintain in any part of world.
- ✓ The frame Grabber PCI card from Winnov-Videum Duo is the core of video acquisition. The broadcast quality and speed is the key to have Video and Audio in real time, without frame loss or poor image quality movies.

Principles of Operation

This unit was conceived and designed based in the latest Microsoft .NET FRAMEWORK 3.5®, DirectShow®, DirectX®, SQL Server® and Remote Server®. These tools allowed us to create the ProDiving in a Windows® Based Application.

An INTEL® CORE 2 DUO E6600 2,4GHz CPU manages all processes:

- A Video Capture PCI card, specially engineered for real-time encoding and archiving, capable to capture two independent audio and video signals up to 640x480 resolution and 25 fps per channel;

- A proprietary USB based interface, PCB designed to acquire all signals from telemetry (Depth and Temperature) and Control 2 independent 12Vdc 35W Halogen Diving lights or 24V 3W LED Lights;

 - A Watchdog circuitry, in case of system crash, to give manual control of diving light and keep audio working in a separate, battery operated, COMMS panel.

Specifications

Power	230Vac 50Hz/60Hz – 110Vac optional – 700VA.
Video Input	2 composite video input 75Ω PAL/NTSC or balanced video over twisted pair, video acquisition @ 25 fps each channel.
Multimedia	DivX® Video @ 640x480 (4:3) and PCM codec audio.
Picture Mode	Simultaneous 2 Channel recording PIP (Picture in Picture)
Audio In	Adjustable Gain Audio Pre-amplifier to match most used COMMS systems.
Telemetry	Pressure transducer 0…10 barg, accuracy 0,25% FS (maximum depth 90 meters of sea water).
Data Storage	2 SATA 230Gb Hard disks, 1 for Windows 7 OS and application software, the second one for data, reports and multimedia files.
Umbilical	Umbilical: 1 x 20 awg twisted pair, 1 x 24 awg pair, 1 x 16 awg shielded twisted pair, 1 conductor 16 awg, 1 x mini RG59 coaxial, outer layer Polyurethane Diameter 0.440" (11.8 mm).
COMMS	4 wires Marsh Marine, Kirby Morgan® Standard Air Intercom.
NMEA Input	RS233 9pin Dsub connector, for GPS input with automatic data validation.
Diving Deco Tables	Deco Tables, US Navy rev 5, French MN90, NR15 from Brazil and NDTT from Norway. Including Repetitive Dive and NITROX.
Dimensions	Width -54 cm Length – 62 cm Height – 58 cm , equivalent 12U 19" rack
Weight	45kg
Options	Mixed Gas Module (Trimix), Water Temperature and Depth RS485 Transducer, Multilingual Menus; Portuguese, English, Spanish and German.

Flight Case Version
(Back side view)

19 inches rack mount
(Front side view, COMMS not included)

There are 2 umbilical connections that can be use to have 2 Divers in water, Video, Light and Sound can be adjusted separately for each Diver. Auxiliary Video and Audio Input for ROV operations recording is also available. All signals are carried by a standard umbilical video cable:

- ✓ 1 x 75 Ohm Low Loss Coax Core - Video Signal.
- ✓ 1 x 1.34 mm² Conductors - +24Vdc Camera Power.
- ✓ 2 x 1.34 mm² Twisted Screen Pair - 24 Vdc / 2A Led Light.
- ✓ 2 x 0.22 mm² Twisted Screen Pair - Depth Sensor.
- ✓ 2 x 0.22 mm² Twisted Pair - Temperature Sensor.
- ✓ 1 x 0.22 mm² Overall Screens - Protective Ground.

Software

Camera and Light Control

Customer and Job details

Main Video window

PIP Secondary Camera

Partial timers, depth, temperature and Deco stage timers

Real time Snapshot photos with Video Overlay

USBL/GPS Overlay using standard NMEA string

Max Depth, actual depth and diver name

Key Customer