Vessel Traffic Management and Information System (VTMIS): Ports and Offshore Traffic Monitoring Solutions

MArinTel

Marintel LLC established in Baku, Azerbaijan in 2010, with the branch office in UAE and partner network throughout the Africa.

Marintel is an influential participant in the maritime electronics, navigation and radio-communications sector, manufacturing and incorporating applications for marine surveillance.

Each project is being tailored for the customer's needs, which are the highest on the agenda. IT, radio hardware and sensors equipment being carefully selected and combined thoughtfully by taking into account their capabilities, quality and the cost.

Integration of the existing port systems such as PMIS, TOS, PCS, ERP and external systems considered accordingly.
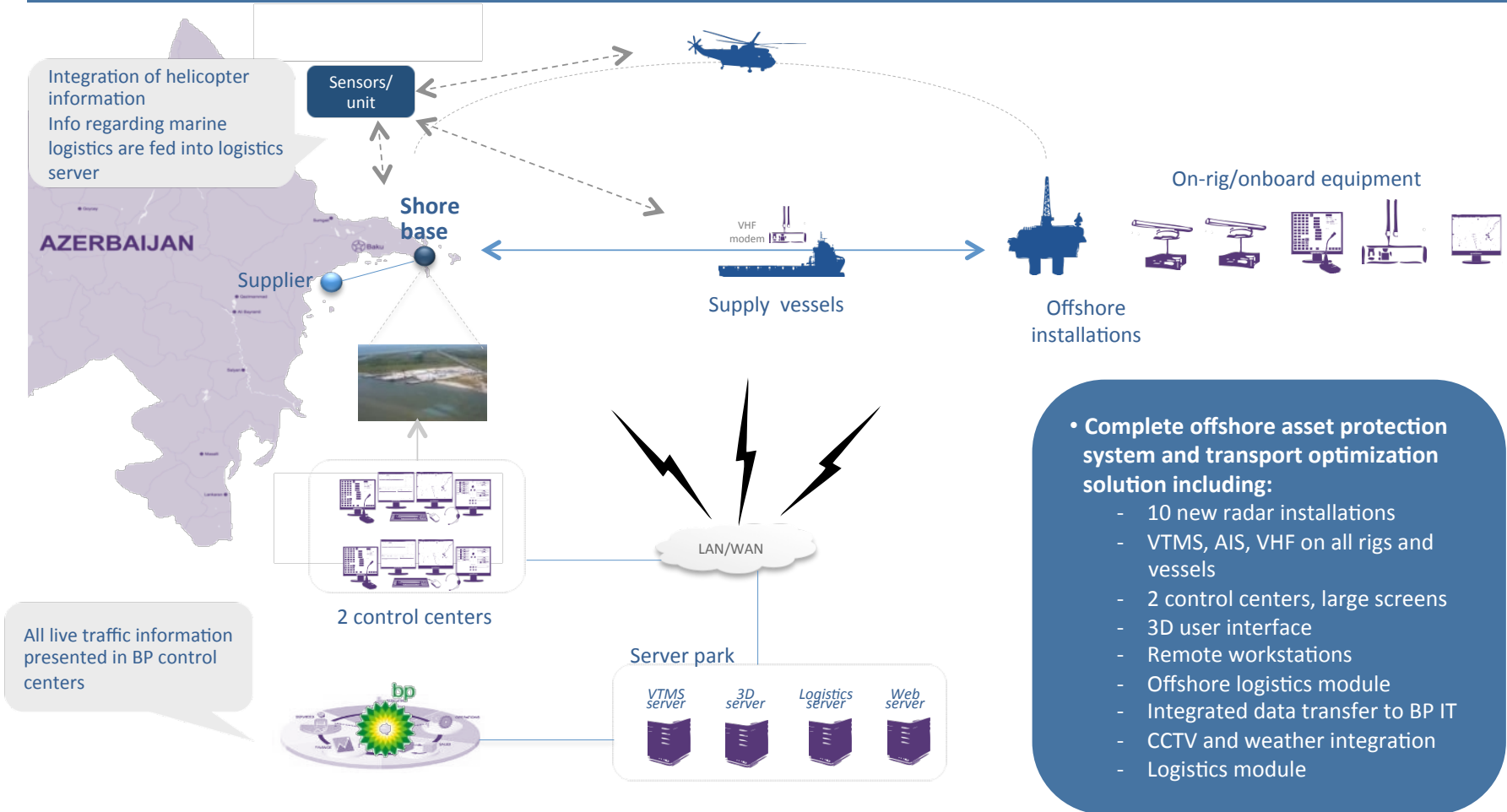
TransOceana

- Part of Marintel group since 2019
- New Zealand Company
- 15 Years experience in GMDSS
- Customers world wide:
   - New Zealand, Chile, Australia, Namibia, Barbados, South Korea, Thailand, Solomon Islands, Taiwan, France, Ukraine, PNG, Iraq Philippines, Portugal, Germany, Indonesia, Germany, U.K., Mauritius, Colombia, India, Nigeria, Denmark, Colombia, Mauritania, Dominion Republic, Spain, Canada, Turkey, UAE
-   44+ projects
-   240+ radio sites
-   200+ radio operators.

OEM of software and hardware components for:
- A1/A2/A3 GMDSS DSC shore stations
- NAVTEX/NBDP
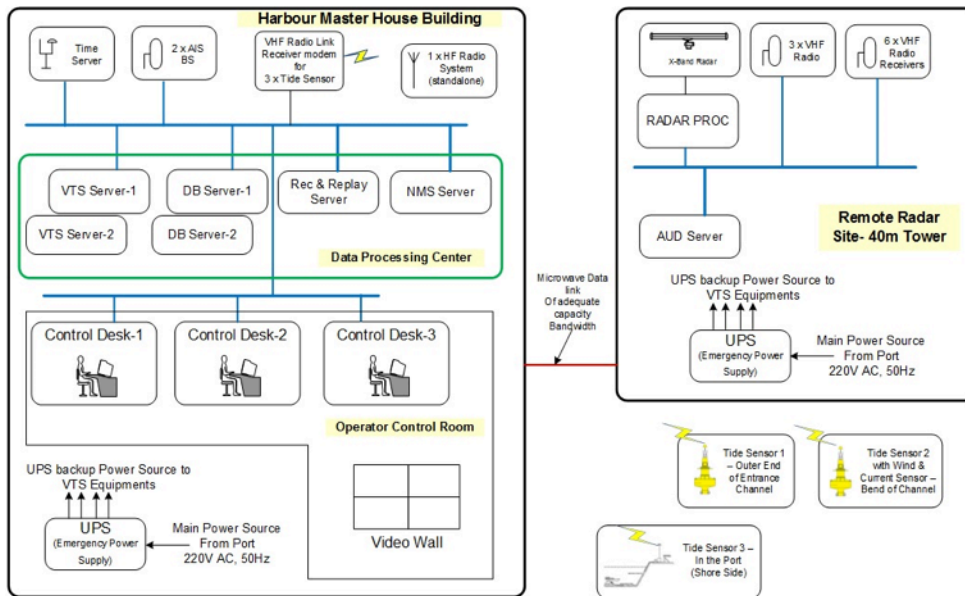- Radio control for voice and digital modes

MArinTel

Marintel successfully delivered several projects, including a sophisticated Marine Asset Protection and Surveillance System (MAPS) for BP Caspian Sea exploration. The project was ongoing in 2013-2016, protecting BP assets from collisions and other threats. The system includes ten offshore and shore-based solid-state radar facilities, covers all BP assets in the Caspian Sea, provides reliable VHF communication solution with the central control room at BP's Khazar center in Baku. Brief system description presented below.

Integration of helicopter information
Info regarding marine logistics are fed into logistics server

Sensors/ unit

On-rig/onboard equipment

AZERBAIJAN

Shore base

VHF modem

Supplier

Supply vessels

Offshore installations

LAN/WAN

2 control centers

All live traffic information presented in BP control centers

Server park

VTMS server

3D server

Logistics server

Web server

- Complete offshore asset protection system and transport optimization solution including:
  - 10 new radar installations
  - VTMS, AIS, VHF on all rigs and vessels
  - 2 control centers, large screens
  - 3D user interface
  - Remote workstations
  - Offshore logistics module
  - Integrated data transfer to BP IT
  - CCTV and weather integration
  - Logistics module

Functional Block Diagram

Harbour Master House Building

- Time Server
- 2 x AIS BS
- VHF Radio Link Receiver modem for 3 x Tide Sensor
- 1 x HF Radio System (standalone)

- VTS Server-1
- DB Server-1
- Rec & Replay Server
- NMS Server
- VTS Server-2
- DB Server-2

Data Processing Center

- Control Desk-1
- Control Desk-2
- Control Desk-3

Operator Control Room

UPS backup Power Source to VTS Equipments

UPS (Emergency Power Supply) — Main Power Source From Port 220V AC, 50Hz

Video Wall

Microwave Data link Of adequate capacity Bandwidth

Remote Radar Site- 40m Tower

- X-Band Radar
- 3 x VHF Radio
- 6 x VHF Radio Receivers
- RADAR PROC
- AUD Server

UPS backup Power Source to VTS Equipments

UPS (Emergency Power Supply) — Main Power Source From Port 220V AC, 50Hz

- Tide Sensor 1 – Outer End of Entrance Channel
- Tide Sensor 2 with Wind & Current Sensor – Bend of Channel
- Tide Sensor 3 – In the Port (Shore Side)

- **Port of Beira surveillance system:**

  - Delivered in 2020
  - 12 feet IALA approved radar on the 40-meters tower
  - Equipment shelter with emergency power supply
  - CCTV, AIS, VHF
  - Control center with operator desks
  - Radio link to the customer premises
  - Weather sensors including hydrological buoys with the tide sensors
  - IALA training for the operators

VTMIS application overview

The VTMIS provides an overview of maritime traffic. The built-in functionality enables it to be used in marine, coastal or port applications and it allows users to develop the essential skills for active service quickly. Traffic Monitor offers the following features:

- Displaying vessel traffic information as an overlay on the electronic chart

- Producing and handling various types of alerts (warning system)

- Chart measures and control tools for different zones, check lines, reference points, etc.

- Displaying radar, CCTV monitor weather and conduct voice communications.
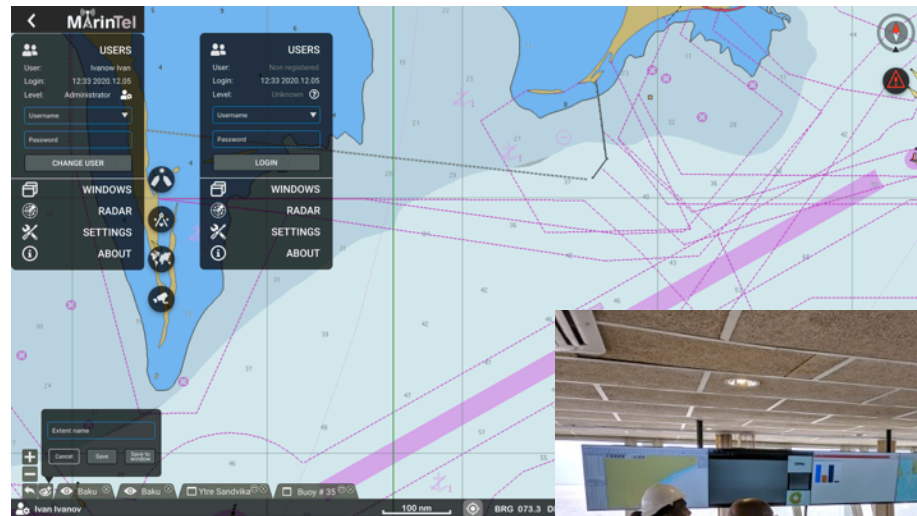
Benefits of VTMIS implementation

- Situational Awareness
- Transparency and accountability
- Tools for tracking and analyzing traffic
- Investigations of accidents
- Detection of potentially dangerous and suspicious operations
- Improvement of the ecological situation
- The ability to better manage resources
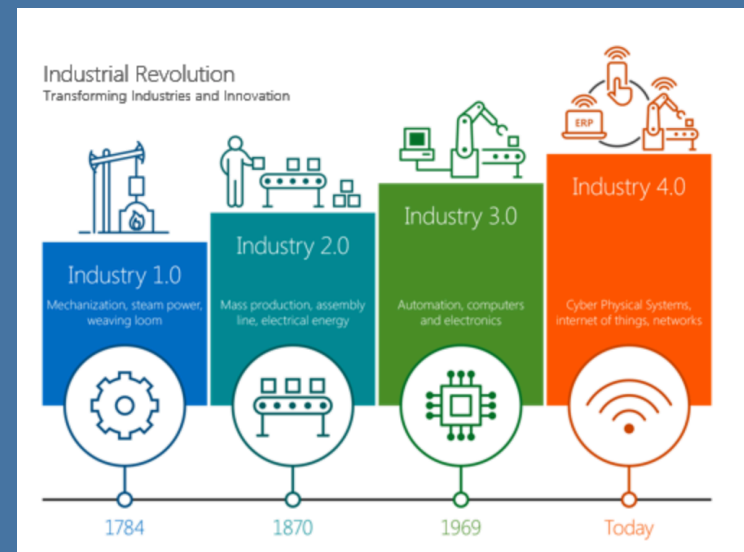- Port tariffs collection

VTMIS Example
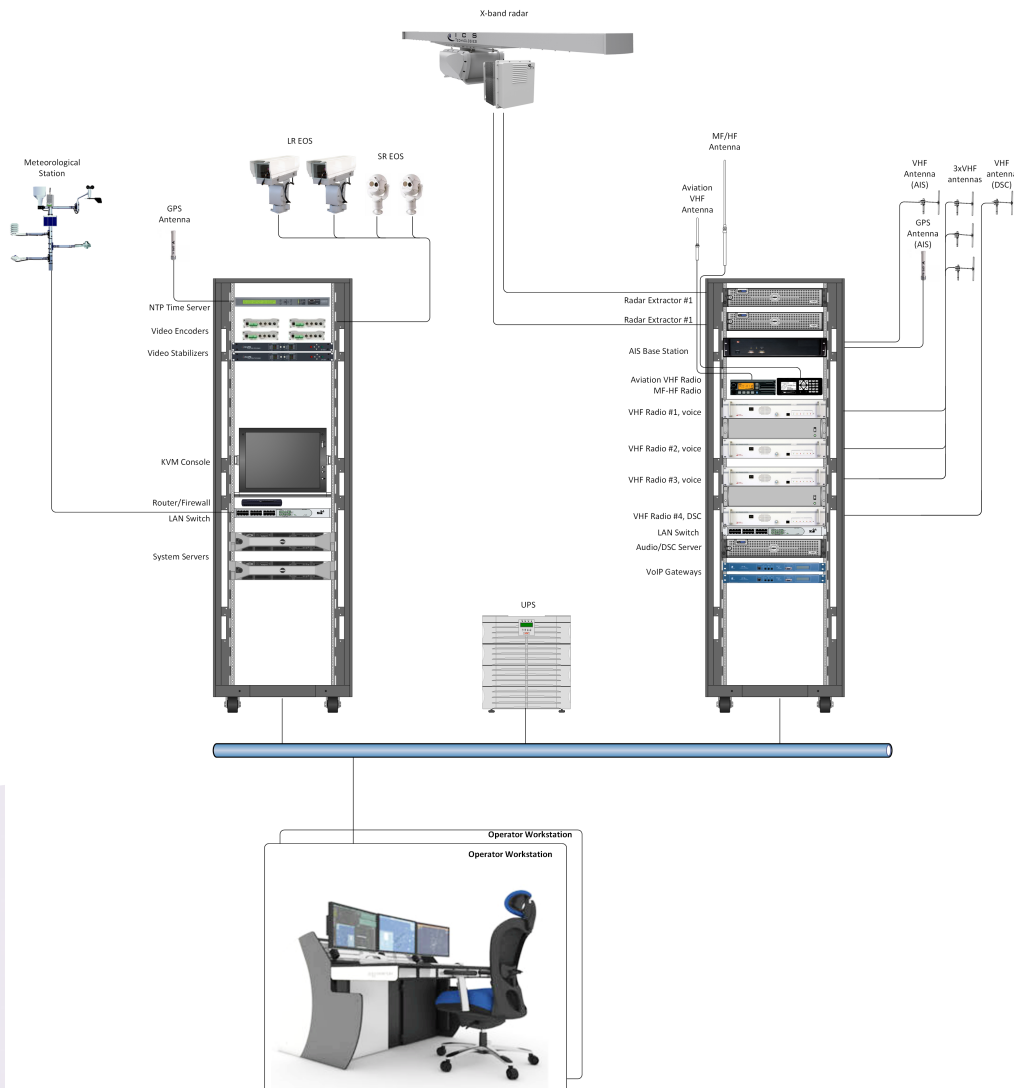
- Radar(s)

- AIS Base Station

- VHF, MF-HF radio communication

- CCTV

- Meteorological sensors

- Operator workstations

- Local servers

- Provision of data to external systems and organizations

Some definitions

"Industrie 4.0 — Smart Manufacturing for the Future", GTAI (Germany Trade and Invest) "Smart industry or "INDUSTRIE 4.0" refers to the technological evolution from embedded systems to cyber-physical systems.- INDUSTRIE 4,0 represents the coming fourth industrial revolution on the way to an Internet of Things, Data and Services. Decentralized intelligence helps create intelligent object networking and independent process management, with the interaction of the real and virtual worlds representing a crucial new aspect of the manufacturing and production process"

Digital Transformation - business and organizational activities, processes, competencies and models to fully leverage the changes and opportunities of a mix of digital technologies.

Industrial Revolution
Transforming Industries and Innovation

Industry 1.0
Mechanization, steam power, weaving loom
1784

Industry 2.0
Mass production, assembly line, electrical energy
1870

Industry 3.0
Automation, computers and electronics
1969

Industry 4.0
Cyber Physical Systems, internet of things, networks
Today

Challenges and Risks

- "Data Silo" – a closed system disconnected from other port IT

- Excessive solution

- One-time engineering

- Big CAPEX means the tender procedure

- No clear monetary benefit of the ownership

Marlin SmartPort

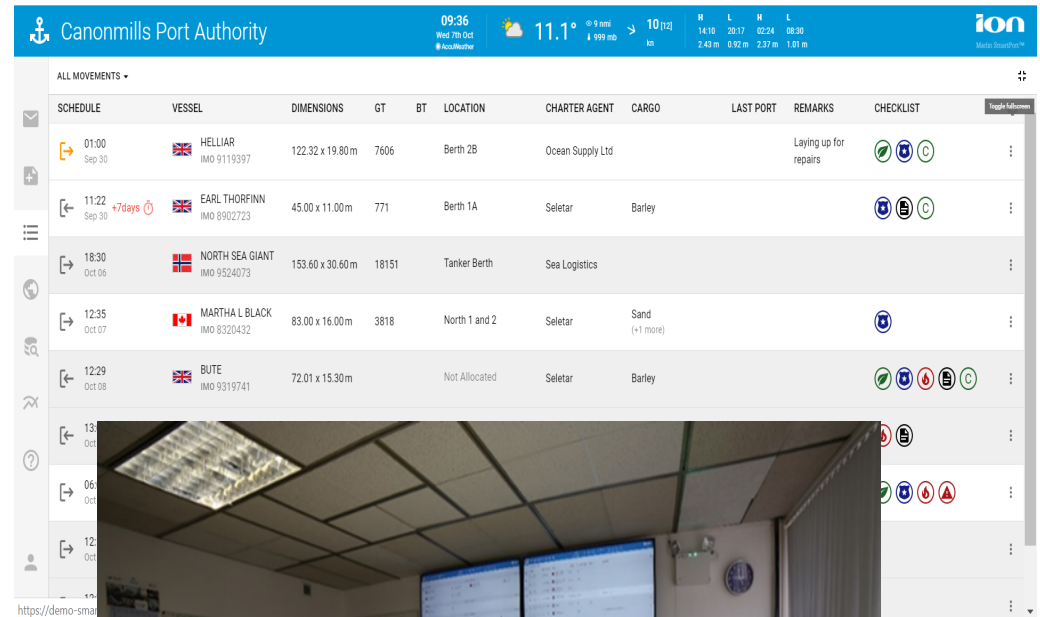*Smarter berth management for ports*

→ **Port Call Management**

- Digitises the port call creation process with a user friendly interface
- Board view gives real time port activity awareness that can be shared with the port community
- Agent and vessel portals for port call request and update
- Real time ETA visibility

→ **Finance**

- Timestamping of core port activities
- Enables accurate billing for all port revenue items

→ **Review**

- Customisable dashboards provide KPI data in a clear format that can be shared with key stakeholders

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To understood requirements for the project (new or existing system upgrade) it is vital to know such factors as certification and standards, ports/offshore objects situation, requirements to the radars and other equipment, availability of the infrastructure (equipment shelters, grid power, transmission channels etc.), control center, voice communication and other information.

We are happy to provide the best solution, tailored to the customer needs.