CVTMIS

Croatian Vessel Traffic Monitoring and Information System

Final Study Presentation

Zagreb,
July 21st, 2008

Index

- Scope of work of the CVTMIS project
- Definition of VTMIS and main benefits
- Legal and organizational framework
- Design of the CVTMIS data management system
- Detailed system design

The CVTMIS Project Team

A consortium was established by

- THETIS
- D'APPOLONIA
- RINA INDUSTRY

To gather the necessary expertise for the activities required

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CVTMIS Overall Objective

- The overall objective of the project is the Improvement of maritime safety and prevention of pollution from ships according Directive 2002/59/EC of the European Parliament and of the Council of 27 June 2002 establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC
- The CVTMIS will manage the maritime traffic in the Croatian part of Adriatic Sea in compliance with the international and EC requirements and taking into account the memorandum of understanding between Croatia and Italy relevant to SAR, traffic separation schemes, ship reporting system and a common VTS System in the Adriatic Sea

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Scope of work

- The scope of the required work is the Preparation of the Project Documentation for the integrated Croatian Vessel Traffic Monitoring and Information System (CVTMIS),
  - Legal and organizational framework
  - Design of the CVTMIS data management system
  - Detailed system design
- Based on the analysis of the existing IT solutions and existing VTMIS documentation and studies

CVTMIS

VTS definition and main CVTMIS requirements

Definition

- A VTS is a service implemented by a Competent Authority, designed to improve the safety, the efficiency of vessel traffic and to protect the environment. The service should have the capability to interact with the traffic and respond to traffic situations developing in the VTS area
- A VTMIS is an information management system that by means of the VTS infrastructures allows to manage:
  - Traffic information;
  - Navigational assistance;
  - Traffic organisation;
  - Transport related information to allow for cooperative resource management.
- A VTMIS gathers, evaluates and distributes vessel traffic and waterborne transport data to improve the safety and efficiency of transport and to better protect the environment

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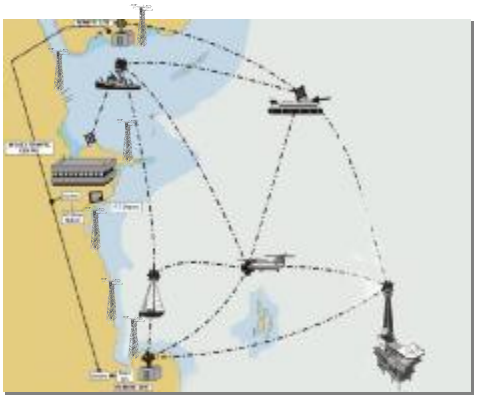
Main benefits



- improve maritime traffic control, especially regarding the mercantile one and its monitoring
- improve the safety of vessel traffic and life at sea (SAR)
- prevention of pollution and investigation about maritime pollution
- favour the intervention and the investigation of the competent authorities in case of accidents or dangerous situations

- to respond efficiently to traffic situations in the VTMIS area
- general maritime safety and security
- to provide information of vessel traffic to other authorities and operators

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Operators concerned

The following main operators are concerned by VTMIS:

- Harbour Masters
- Port Authorities
- Pilots, Tug boats, mooring men
- Agencies
- Customs
- Police
- Terminalists, Forwarders, Stevedores
- Ship owners

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Main Requirements

- The CVTMIS should allow effective surveillance, monitoring, supervision, and management of the surface traffic within the whole area
- The use, exchange and integration of data on national level, regional level as well as EU level in line with the requirements of EU Directive 2002/59/EC
- The system shall be able to integrate the following existing system:
  - AIS network, through local Ethernet interface: AIS data of all vessels are received and AIS messages are transmitted according to ITU-R M1371-1;
  - Existing / planned PMIS system in ports
  - Existing Arrival/departure system

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Legal and Organizational Framework

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Requirements

- To prepare state of the art
- To evaluate all the relevant laws and regulations
- To evaluate possible scenarios
- To propose the legal and institutional framework
- To propose the organizational framework

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Main activities

- Identification and collection of relevant local, regional, national, international rules and regulations concerning the implementation of VTS
- Identification of Croatian Authorities and other international and foreign authorities competent for VTS
- Present organizational framework
- Collection of maritime traffic data
- Collection of accident data, information and statistics

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Main activities

- Evaluation of possible solutions considering the existing situation and data collected
- Identification of the best solution for the Croatian CVTMIS
- Preliminary analysis of VTMIS Operators workload,
- Human resources needs
- Human resources management system
- Recommendations on institutional arrangements of the VTMIS service
- Administrative and procedural arrangements including application of VTMIS tools for the establishment of VTS service

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Authorities and bodies directly/indirectly concerned with VTS system

All Croatian maritime concerned bodies have been considered evaluating their tasks and responsibilities.

- Harbour Master
- MRCC
- Port Authorities
- Coast Guard
- Plovput

Authorities and bodies directly/indirectly concerned with VTS system

Other related authorities have been taken in account as well, accurately defining their missions and examining possible interactions with VTS system.

- Croatian registry of Shipping
- Agency for for Coastal Maritime Liner Shipping
- Croatian Hydrographic Institute
- Marine Metorological Centre
- Minister of Interior
- Minister of Defence
- Minister of Agriculture, Fishing and rural development

Possible scenarios of future framework

- Scenario n.1 – Port Authority entrusted with VTS system
- Scenario n.2 - Agency entrusted with VTS system
- Scenario n.3 - Harbour Master entrusted with VTS
- Scenario n.4 - MRCC entrusted with VTS system
- Scenario n.5 - MRCC at national and regional level and on local level cooperation between HMO and PA

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Scenario n.5 - MRCC at national and regional level and on local level cooperation between HMO and PA –SWOT analysis

Main disadvantages	*Main advantages*
Definition of competence of MRCC and PA on the waters	Modest amendments of the present legislation
Homogenize operators belonging to two different bodies	Modest amendments to Maritime Code
	MRCC operators already used to the management of maritime events, even particularly complex
	Fastening of planning operations
	Fastening of communications to port services
	Sharing of all possible raising troubles and global vision of all maritime problems
	MRCC and PA operators are already familiar with usage of VHF/FM radio
	MRCC operators have deep knowledge of the weather bulletin, are able to interpret them properly and to transmit relevant information
	Management of HAZMAT

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Main tasks and responsibilities

Main tasks	NCC (MRCC)	RCC (MRCC)	LCC (HM)	PA	Plovput
Authority managing VTS on EEZ up to Croatian base line	X				
Authority managing VTS in internal waters		X			
Safety instruction in port approach		X	X		
Planning of information in port			X	X	
Final approaching stage and operation in port - under control of Regional MRCC				X	
Legal control granting the respect of national and international maritime laws and possible authorizations.			X		
Inward/outward clearance: permit ship to enter/leave the port			X		
Approve communication on operative final clearance to vessels leaving/approaching anchor/berth and communication with vessels in approaching/leaving patterns		X			
Regular Information service of the VTMIS					X
Operative Information services	X	X	X	X	

SAR structure remains unchanged (VTS supporting SAR operation)

Legal framework

- To establish the CVTMIS service by amendments to Maritime Code and law on HMO
- Harmonization of the Croatian Maritime legislation with the relevant provision contained in the Directive 2002/59 CE.
- To establish VTS responsibilities and detailed organization through a MSTI Ministerial Decree / Ordinance

VTS territorial structure

- **NCC** – Permanent Surveillance over all the routine operations of the RCC and LCC with spot checks, managing VTS on EEZ up to Croatian base line. It intervenes on demand or on its own initiative in critical situations that could involve the maritime safety of the territorial waters or of part of them.
- **RCC** – Permanent surveillance on internal waters and over routine activities of the LCC and intervenes on demand of LCC or on its own initiative in case of emergency or of a difficult situation.
- **LCC** – Permanent surveillance in harbour area and port approaches and solves all the routine situations

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VTS territorial structure

RIJEKA
NCC (National Control Centre)
RCC (Regional Control Centre)
LCC (Local Control Centre)

LCC PULA

LCC SENJ

RCC – LCC SIBENIK

LCC ZADAR

RCC – LCC SPLIT

LCC PLOCE

LCC DUBROVNIK

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Geographical areas of responsibilities

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VTS organization

- OPERATORS that represent the first level, as they are in charge of daily routine.
- TEAM LEADERS, that are in charge of the first decisions of the system and of the routine: for instance, in case of two ships on dangerous course with high collision risk, he immediately contacts both masters suggesting further motion elements in order to bring the situation back to normality.
- The third level is represented by SUPERVISORS that are not required to be steadily present in the operating room. On demand of the Team Leader, the supervisor is assigned the task to solve all the complex emergency situations and moreover he is the main point of reference for the upper authorities

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Data Management System

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Main requirements

- To improve maritime data management
- To consider international and regional exchange of data pursuant to the requirements of Directive 2002/59/EC and ADRIREP (mandatory ship reporting)
- To provide recommendation on data management
- To prepare a design of the CVTMIS data management system

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Data management development

- State of-the-art of related systems in Croatian ports
- Analysis of information flow in ports and main users involved
- Evaluation of all documents exchanged in ports between Business Users to Authorities
- Analysis of data upgrade based on EU Directives and ADRIREP
- Analysis of main operations in ports
- Definition of data management architecture
- Definition of system interfaces

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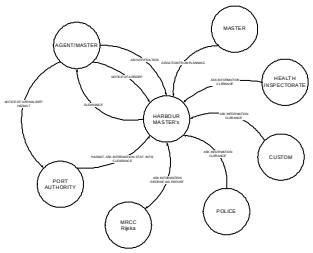
Information flow in ports



- Several authorities involved:
  - HMO
  - Maritime Police
  - Custom
  - Port Authorities
  - Health Inspection
  - MRCC
- Most of the communication are done using paper document and email
- Under current directives and regulations, the agents is faced with a lot of reporting, often having to send the same information numerous times to different authorities
- One of the most important process is the clearance process : to assess the request to enter/departure a ship in order to allow the ship to enter or leave the port (under HMO responsibilities), involving all the other authorities

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Documents in ports for inward/outward clearance

Doc No.	Document type	Agent / Master	HMO	Port Authorities	CUSTOM	POLICE	HEALTH INSPECTION	Note
1	Pre-Notice of Arrival	X	X	X	X	X		OPEN SEA
2	Notificaton of Dangerous Goods (DCR Form)	X	X	X				OPEN SEA
3	Waste Notification	X	X	X				OPEN SEA
4	Maritime Declaration of Health	X	X	X		X		OPEN SEA
5	Ballast Water Reporting (BWR Form)	X	X	X				OPEN SEA
6	ISPS Pre-Arrival Notification	X	X	X				OPEN SEA
7	Ship Call	VHF	X*	X				Approaching Port
8	Arrival Information Notice	X	X	X				In Port
9	Crew List (in)	X	X	X	X	X		In Port
10	Passenger List (in)	X	X		X	X		In Port
11	IMO Ship's Store Declaration	X	X*		X			In Port
12	IMO Crew's Effects Declaration (in)	X	X*		X			In Port
13	Change of Berth		X	X				In Port
14	Permission for a Vessel to have	X	X					In Port
15	Declaration of Departure	X	X	X		X		Departure
16	Crew List out	X	X	X	X	X		Departure
17	Passenger List out	X	X	X	X	X		Departure
18	Stability Calculation	X	X	X				Departure
19	Dangerous Cargo Plan	X	X	X				Departure
20	Permission of Vessel's Departure	X	X					Departure

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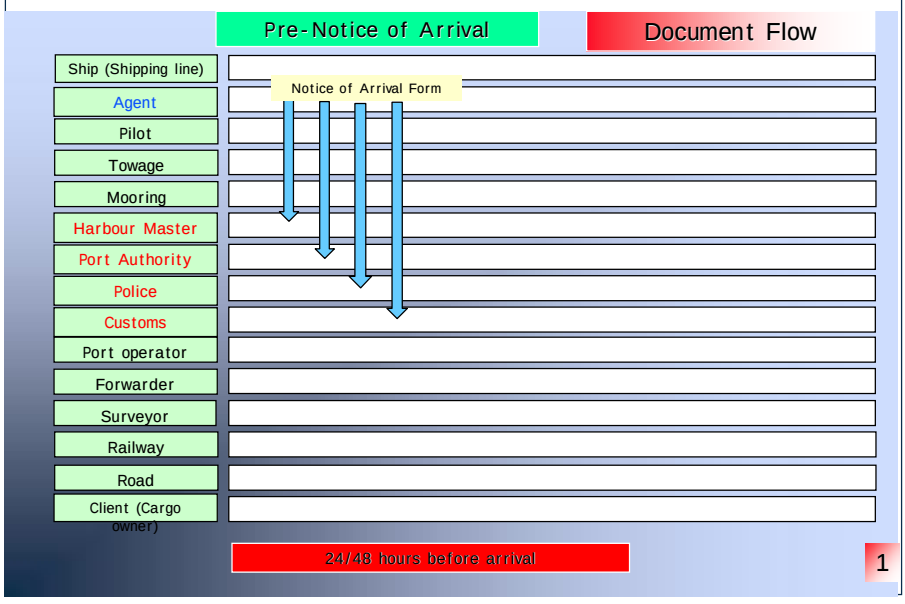

Data management system design

- Introduction of a single windows concept in order to report ones into the system through implementation of documents related to inward and outward clearance
- Automatic delivery of information to all the relevant authorities through the National Single Windows
- Implementation of the clearance process in ports with the active contribution of the main users
  - Ones received the information, authorities can assess the information and confirm the clearance in order the ship can enter or leave the port (at certain condition if required)
  - Harbour master can send the final assessment and comunication to the master ship and agent for clearance

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Data management system design

- Delivery to all Authorities and users information as list of arrival and departure planning, status of ship, ETA data upgrade, etc for operation use in ports
- Integration with SafeSeaNet for data exchange
- Integration with existing/future PMIS/PCS for data exchange

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Data management system design: main benefits

- Simplification of reporting
- Increased access to data and interoperability to authorities and users
- Exchange of all relevant information
- More reliable information
- Real time data exchange
- Use of data for operational use
- Integrated reporting to SafeSeaNet and ADRIREP

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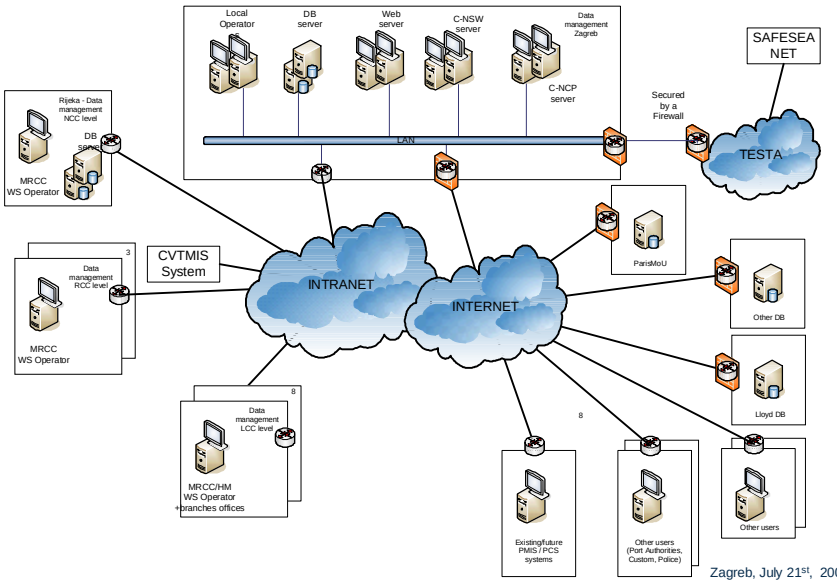
System Architecture



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Data Management functions

Function	Description
Vessel data management	to enter, update, search vessel, location, user, etc data
Vessel booking	to enable agents to enter or update the Voyage Booking
Visualize traffic information	to visualize and search vessel voyages
Clearance Management	To manage the clearance process in ports
Safeseanet data management	To enter / search data to safeseanet
Traffic management	to update voyages
Traffic reporting and analysis	to display / print reports of historical data
Inspection management	to enter, update, search inspection vessel data for planning purpose
Incident reporting	to enter and track incidents information
Maintenance	to allow configuration and maintenance of the system

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Integration with external systems

- CVTMIS
  - Exchange of AIS and pseudo AIS data
- SafeSeaNet
- Existing/Future PMIS/PCS in port
- ParisMoU as consultant database
- Lloyd database as consultant database

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CVTMIS
System Design

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System Design Methodology

- Review of the Feasibility Study
  - Analysis of existing documentation (Pre-Feasibility Study, Feasibility Study,…)
  - New revision of Feasibility Study developed
- Site Survey
  - Detailed visits to all envisaged sites
- Definition of CVTMIS architecture
- Design of System Components
- Definition of Functions and Interfaces
- Performance Assessment at all sites

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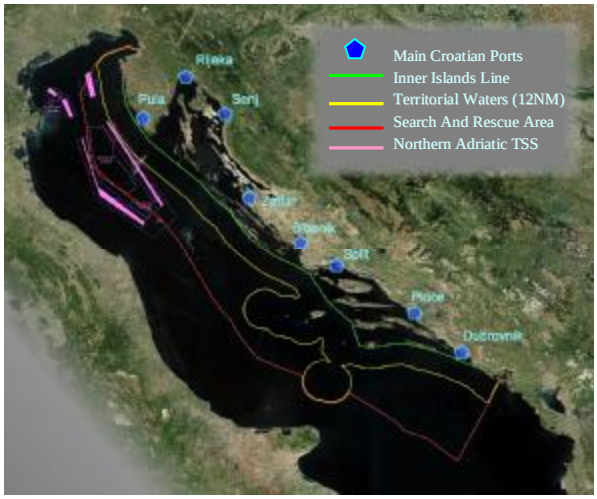
Main Requirements

- The CVTMIS System Design has been conceived in order to facilitate the implementation of the discussed organization framework and exchange of data.
- The CVTMIS shall allow full coverage of:
  - the Croatian territorial waters (12NM line),
  - the access waterways to the main ports,
  - the Search and Rescue Area under control of Croatia authorities,
  - the traffic separation scheme of the Northern Adriatic Sea (TSS).
  - three types of areas have been identified:
    - » Area A: shown in red in the following figure, covering the SAR line, the TSS scheme and the territorial waters, but excluding the inner islands areas;
    - » Area B: shown in green, covering all the access waterways to the eight major Croatian ports;
    - » Area C: shown in yellow, covering the inner islands areas excluded by Area B

Main Requirements



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Main Requirements

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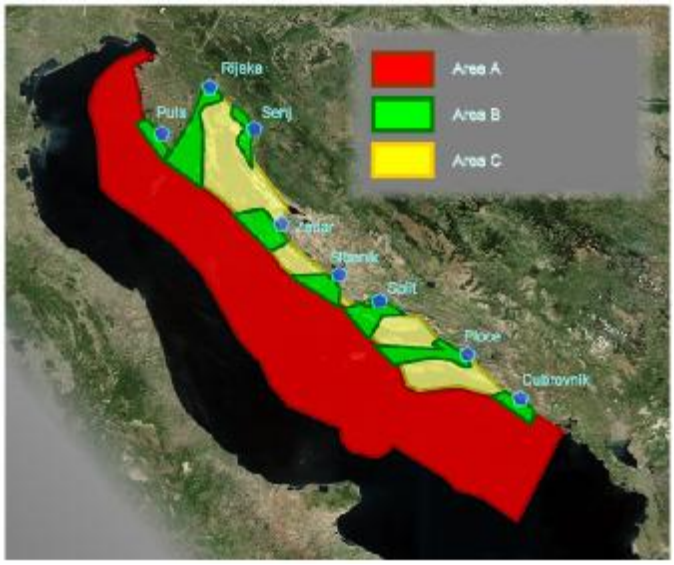
Main Requirements



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Example of Site Survey (1/2)

SITE	**Brdo Goli**
LOCATION	**Hill near town of Labin**
DATE OF VISIT	**21.02.2008**
CVTMIS SITE ID	**RSS3**
COORDINATES	**Lat: 45°01'11.34"N Lon: 14°07'23.11"E**
ALTITUDE	**538m a.s.l.**
POWER SUPPLY	**Tri-Phase 380 V**
NETWORK AVAIL.	**YES**

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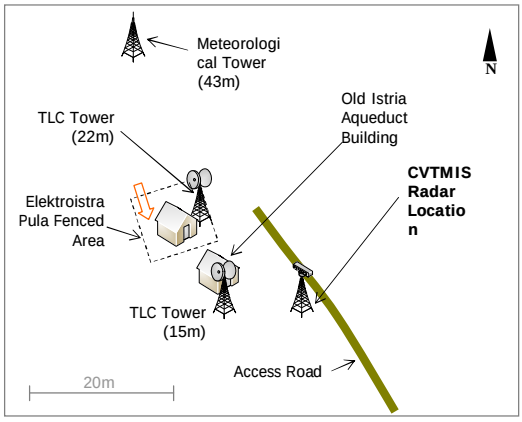
Example of Site Survey (2/2)

- Fenced area of Elektroistra Pula
- Shed inside the fenced area with equipments of Elektroistra Pula
- 22m telecommunications tower
- Shed of Istrian Aqueduct
- Second telecommunications tower (15m)
- Meteorological tower (43m)



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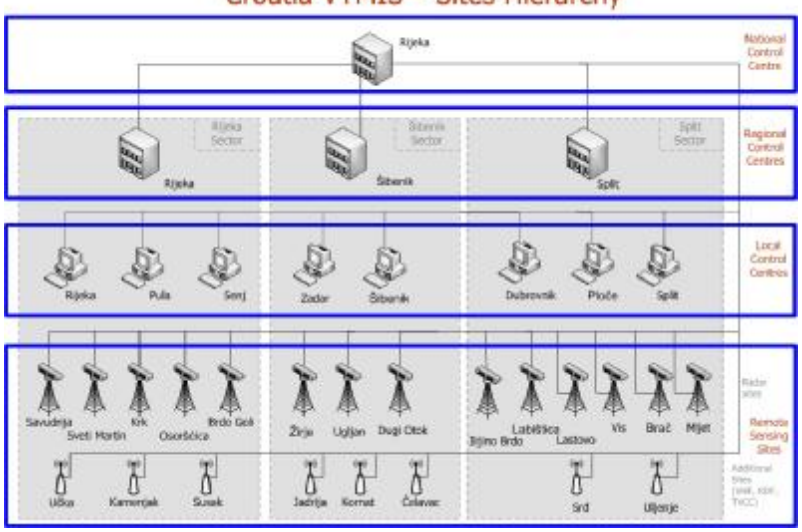
CVTMIS Architecture



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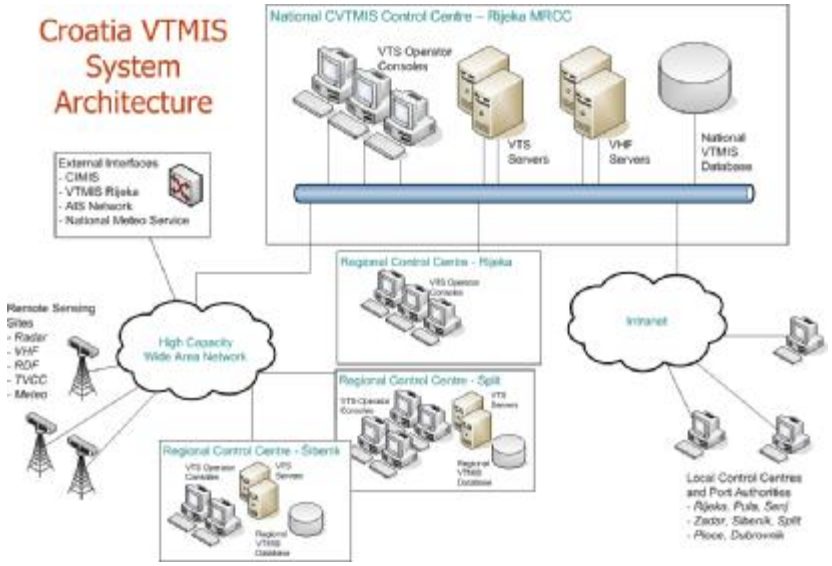
CVTMIS Architecture



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CVTMIS Scope of Supply Control Centres

- Central VTS server sub-system
- VTS Recording and Playback Server
- VHF server
- VHF Recording and Playback Server
- Database server sub-system
- VTS Operators Console
- Supervisor Console sub-system
- Training Instructor Console
- UPS and Diesel generator

Local Control Centre shall access the central system through a web browser application already available on existing consoles.

CVTMIS Scope of Supply Remote Sites

- Radar sub-systems with service display and redundant transceiver, radar extractor and tracker
- VHF Radio Base Station sub-system
- Radio Direction Finder sub-system
- Maritime Camera with video encoder
- Meteo station
- UPS and Diesel generator of 12KVA
- Remote site auxiliaries (shelter, mast, air conditioning, power generation backup, lighting protection)

CVTMIS Functions

The main functions performed by the CVTMIS will be:

- Maritime traffic image handling;
- Database handling;
- System Supervision;
- Recording and Archiving, Playback and Support to on-the-job training (only at NCC);
- Training Instructor Module (only at NCC);
- Interoperability with external systems (only at NCC).

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Integration with external systems

- National Croatian AIS
  - Data exchange with AIS National centre in Rijeka MRCC
- Marine Meteorological Centre
  - Acquisition of Meteorological data (raw data and forecasts) from Hydrological Institute
- Plovput
  - Integration of CH16 radio channel
- VTMIS PRA Rijeka
  - Exchange of AIS and pseudo AIS data
- Existing & future Data Management system
- Lloyd database as consultant database

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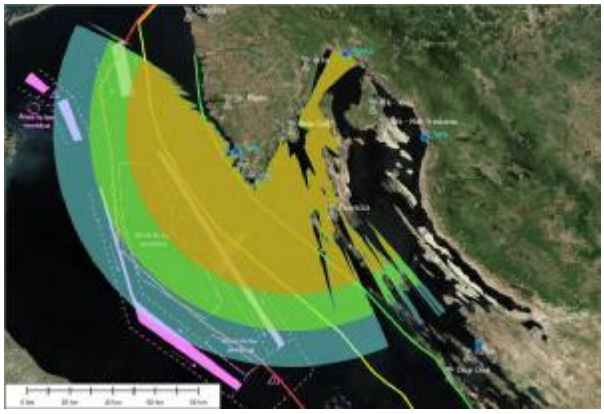
Radar Subsystem

- X-Band Radar Stations (High Priority)
- X-Band Radar Stations (Low Priority)



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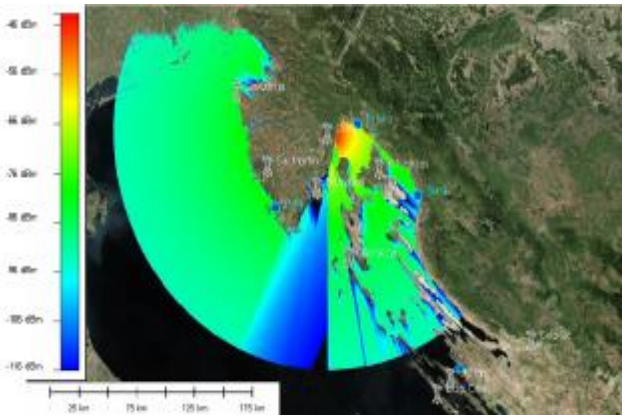
VHF Subsystem

- Complete Radio Stations (Duplex voice communications, Distress Signal Calls CH70)
- Integration of Plovput CH16 in 8 stations



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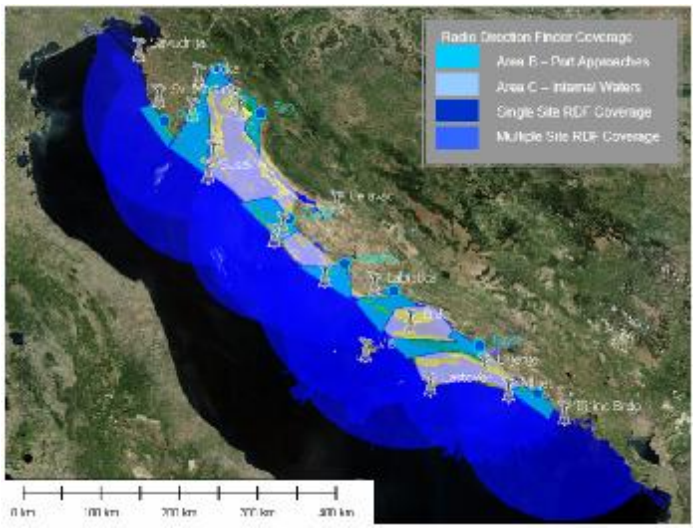
Radio Direction Finder Subsystem

- 10 RDF Stations
- Multiple site coverage for triangulation



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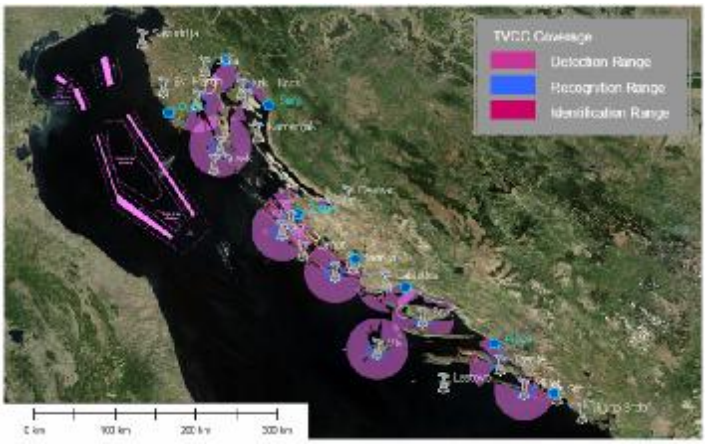
CCTV Subsystem

- 12 Closed Circuit TV Stations
- Sensor Type: CCD
- Focal Length: 450mm



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