

The future of VMS systems

Where are we going?

Outline

- VMS systems
- The MONICAP System
- VMS today
- Evolution of VMS
- Conclusions

Fisheries management

- Coastal & State fisheries authorities are responsible for the management of fisheries located within the 200 nmi Exclusive Economic Zone
- Management includes:
 - Fisheries legislation
 - Stock monitoring and limits definition
 - Surveillance and monitoring of vessel activity
 - Enforcement operations
 - Prosecution of vessel owners & operators

Surveillance and monitoring

- Surveillance of the fishing fleet is necessary to ensure that vessel operators comply with fisheries legislation
- Traditional techniques include the monitoring of fisheries from air and surface, on board observers and analysis of catch records and vessel logbooks
- Experience shows that the efficiency of these techniques can be drastically enhanced by the use of a Vessel Monitoring System (VMS)

The VMS is essentially a technology that permits **AUTOMATIC** satellite tracking (real-time or historical) of **PARTICIPATING** fishing vessels, with a reasonable level of accuracy and reliability

Evolution of electronics,
telecommunications and
information technologies (namely
satellite commercial exploitation)
have disseminated VMS trials and
implementations all over the globe
in the last decade

VMS concept

- Blue Box: positioning, transceiver, antennas
- Position Reports
- Fisheries Management Centre (FMC)

What VMS does

- Vessel tracking
 - Position, speed, course + date-hour
- Identify probable fishing activity
 - deterrent effect, ie, preventive measure rather than a cure
- Two-way communications with the vessels

What VMS does not do

- The VMS will not locate the vessel that is not participating (it is not a radar)
 - It does not replace traditional MCS activities, rather provides another tool
- By itself does not provide evidence to satisfy most criminal courts of an offence
 - credibility over time
 - complete available information

How VMS works (I)

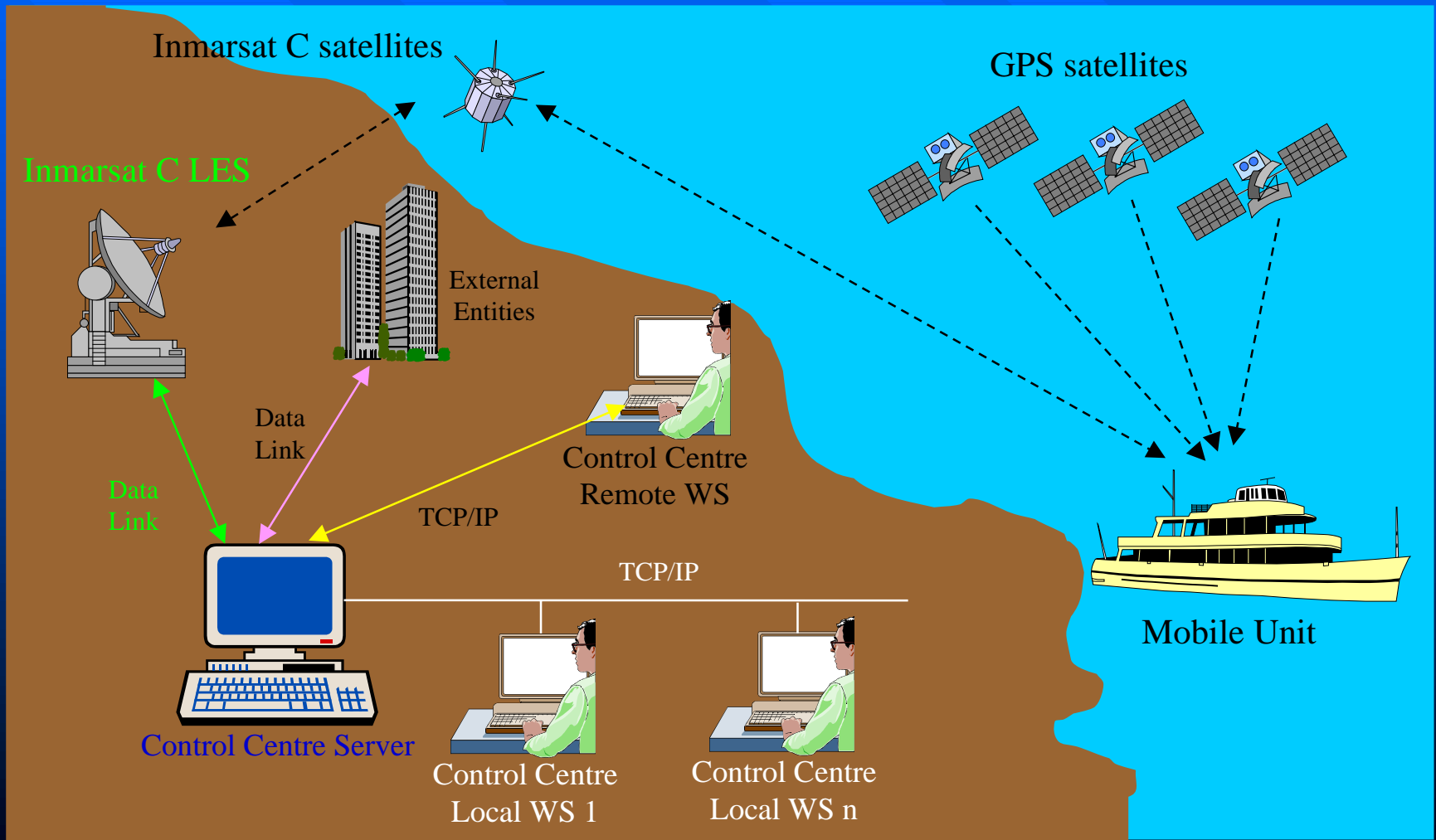
Information is:

- Sampled in the vessels
 - Position, course, speed e date-hour
- Transmitted to a Control Centre
 - Periodically; “on request”
 - Wireless network (satellite, radio)

How VMS works (II)

- Processed
 - Database, GIS
- Validated and analysed
 - Manual or automatically
- Rerouting to competent authorities
 - Integration with other systems

VMS scenario



The MONICAP System (I)

- 1988 - Begin of Portuguese Pilot Project
- 1989 - Experimental Prototype I
- 1990 - Experimental Prototype II
- 1991 - Real time demos - EU
- 1992 - Industrial Version I
- 1992 - Begin Portuguese fishing fleet
- 1994 - JA Spain

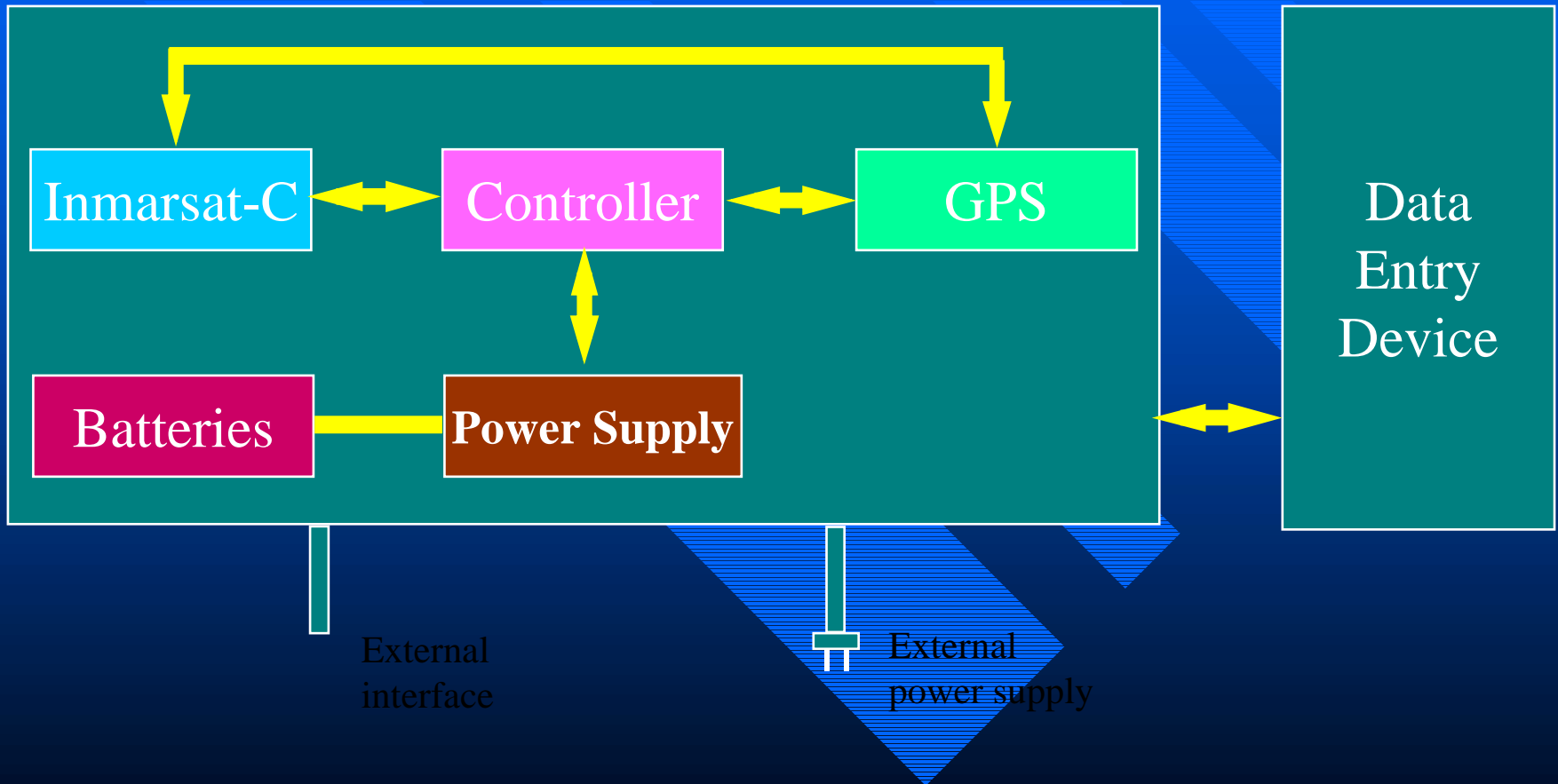
The MONICAP System (II)

- 1994 - Irish Navy
- 1995 - MAP France
- 1996 - Industrial Version II
- 1997 - MP Angola
- Summary
 - 5 Countries
 - 829 Mobile Units
 - 3 Control Centres
 - Various communication interfaces

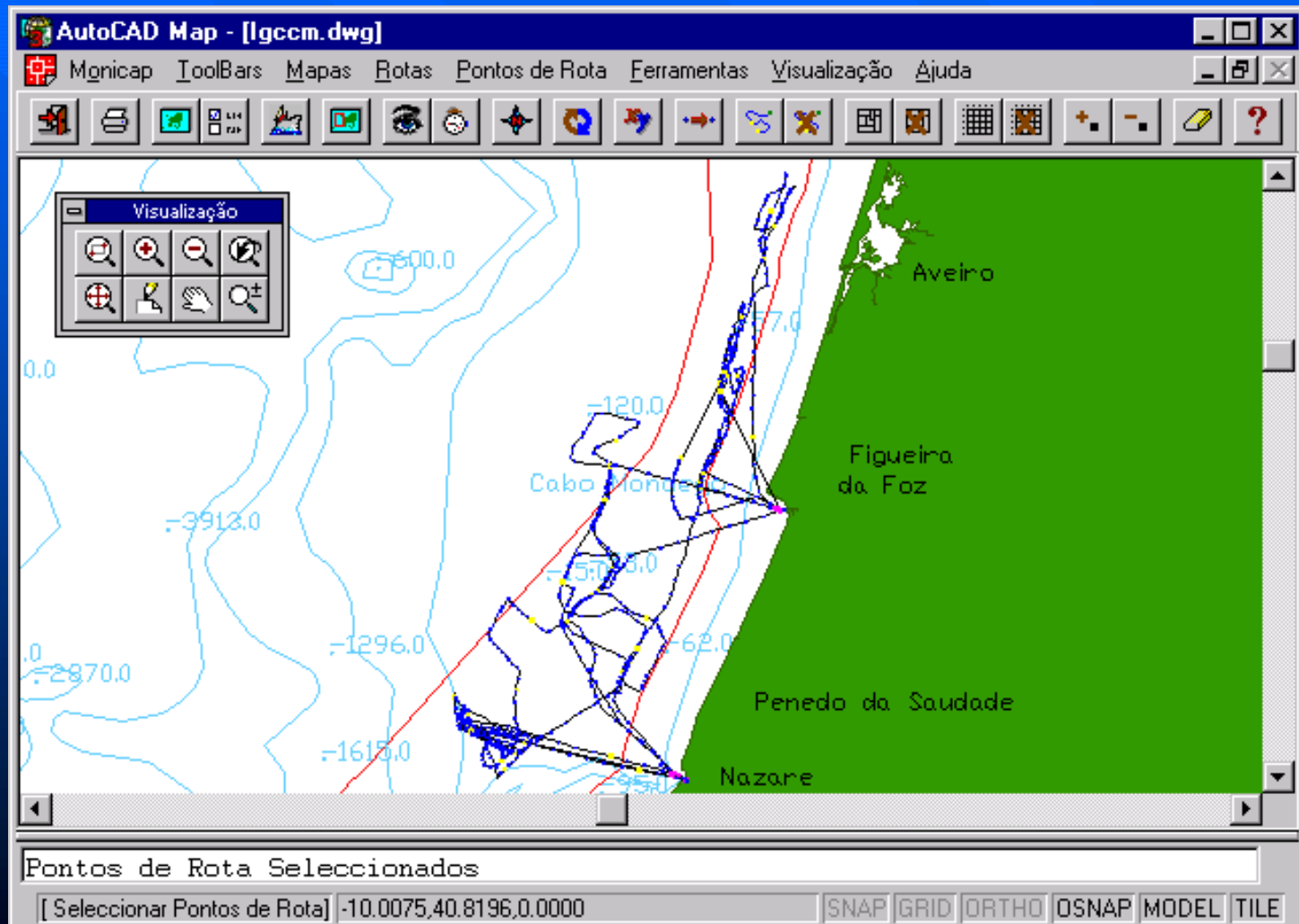
MONICAP Blue Box



MONICAP Blue Box



MONICAP Control Centre



Implementing a VMS system (I)

- Analyse fishing situation
- Entities framework
- Legal framework
- Functional specification
 - capacity and performance
- Integration with existing tools

Implementing a VMS system (II)

- Exploitation and maintenance needs
 - human, installation, finance, institutional relationships
- Type approval and certification
- Installation and putting to operation
 - Mobile units
 - Control Centre
 - Communications

Implementing a VMS system(III)

- Security of mobile units, control centre and data
- Education and training
- Procedures
- Maintenance
- Evolution

The decision to use VMS for fishing management is a long term investment, in terms of personnel and specification, installation, operation and maintenance of the system.

Current VMS functions (I)

- Tracking of PARTICIPATING vessels
 - position, speed, course and date-hour
- Identify probable fishing activity
 - including probable targeted species
- Two-way communications with the vessels
 - including, eg, email
- Restricted area violation detection

Current VMS functions (II)

- Investigate NON-PARTICIPATING vessel activities
- Provide near real-time monitoring of vessels during an enforcement or pursuit operation
- Confirmation of claimed catch data from vessel's log
- Detection of probable trans-shipment of catch while at sea

Current VMS functions (III)

- Collection and processing of catch reports (and other reports) from vessels
- Search and rescue
 - finding vessels in neighbourhood of ship in distress
 - if ship in distress has a blue box then the last reported position may be used to narrow the search area
- (Limited) tracking of non-fisheries related vessels such as chemical, gas and oil tankers

VMS Evolution (I)

- Electronics, Microelectronics
- Communications
- Sensors
- Information systems
 - DBMS, GIS, Datawarehouse
- Computational systems
- HMI (VMS ITS terminal?)
- Internet
- Digital maps

Communications (I)

- VHF (DSC)
- GSM
- TETRA
- Duplex satellite systems
 - Globalstar; ICO; Inmarsat A, B, M; Iridium; Odyssey
 - Advantages
 - » voice, fax, accepted by crew
 - Disadvantages
 - » unpractical; expensive for small data packets; position report while talking?

Communications (II)

■ Data satellite systems

- Argos; Inmarsat C, D; LEO one; Orbcomm; Omnitrac/Boatrac; Starsys
- Advantages
 - » ideal for small packets, low cost, reduced size, written record
- Disadvantages
 - » normally of complex usage, interesting for vessel-earth comms and not vice-versa

Communications (III)

- Earth Observation Satellites (EOS)
 - accuracy 1-3m a 1km
 - photos, SAR, colour images, infrared images
- RadarSat
 - “no visibility” conditions
- Meteorological satellites

Sensors

- Power/temperature of engine
- Fishing gear state
- Storage temperature
- Sea water temperature
- Algae concentration
- Video

VMS Evolution (II)

■ International standardisation efforts

- » physical, functional requirements
- » installation
- » approval
- » data
 - type, format
 - security (integrity, authenticity, privacy, non interference, verification)
- » polling
- » information sharing (system, protocol)

VMS Evolution (III)

- Greater automation
 - daily captures
 - landing monitoring
- Integration with VTS, Black Box, Cargo Box, Automatic Ship Identification
- Useful safety and security tool
 - SOLAS
 - GMDSS

VMS Evolution (IV)

■ R&D

- » monitoring and conservation of resources, definition of limits, areas, seasons, gear
- » several studies with interest to the sector
- » fishing impact in biology, environment, economy and society

■ To the crew

- weather conditions and forecasts
- navigation aids
- data on fishing areas of interest

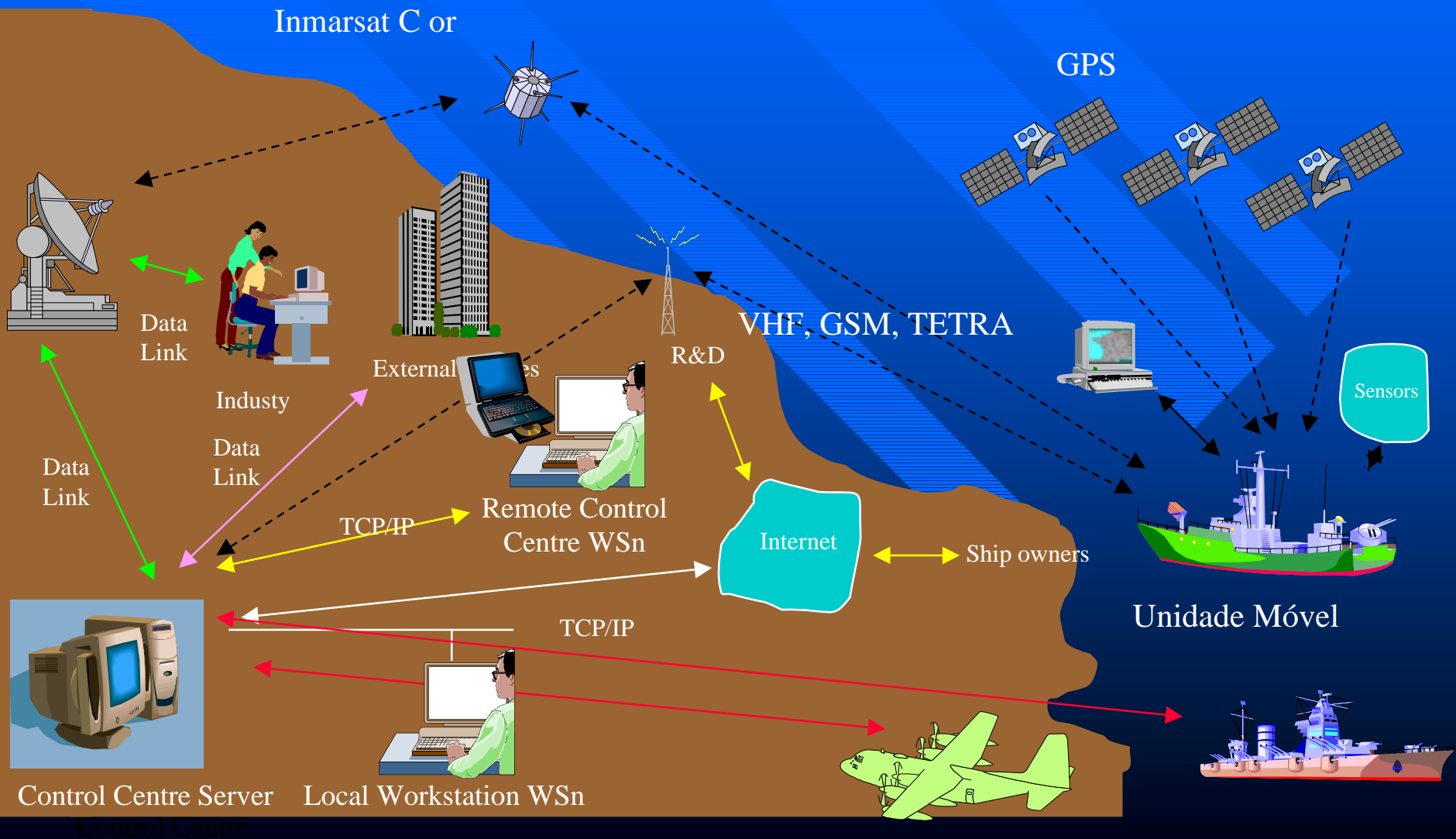
VMS Evolution (V)

■ To the industry

- exploitation support
- fleet management
 - » operations, maintenance and support, marketing
- fleet safety and security
- data on fishing areas of interest
- electronic logs
- anticipated sales

Mainly, transforming the “VMS Big Brother” interpretation, by including industry perceived value added services

Future VMS scenario



Conclusions

The VMS systems provide information about fishing vessel positioning with a high degree of safety and reliability, as well as giving likely fishing activities indications with a reasonable probability. To make them “industry friendly” will open up broader acceptance from involved parties in the preservation, exploitation and management of world marine resources.