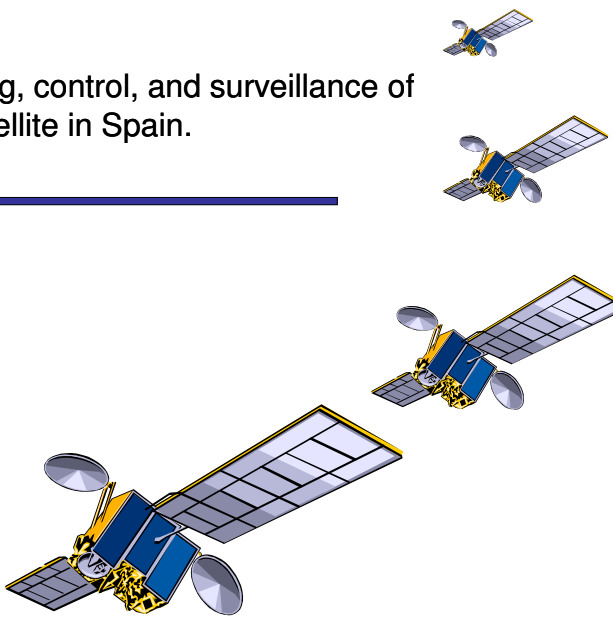


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SECRETARÍA GENERAL DEL MAR

VMS: monitoring, control, and surveillance of fisheries by satellite in Spain.



Zagreb (Croatia) 28/11/2011 Spanish - VMS 1 out of 42

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VMS in Spain

VMS allows:

- To control closed or restricted areas, fishing effort, etc.
- To be a dissuasive tool for many fisherman.
- To know the most habitual ilegal fishing vessels.
- To increase the conventional surveillance systems efficiency by planning operations.
- To serve as source of Data Cross Checking with information like: registered on logbook, licenses, inspection reports ...

Zagreb (Croatia) 28/11/2011 Spanish - VMS 2 out of 42

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<p>Its main objective is to support fisheries enforcement (closed or restricted areas, fishing effort, etc):</p>			
			
			
			
			
<p>Zagreb (Croatia) 28/11/2011 Spanish - VMS 3 out of 42</p>			

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<p>but it also has others:</p>			
<p>Assisting combating the piracy conflict</p>			
			
<p>Zagreb (Croatia) 28/11/2011 Spanish - VMS 4 out of 42</p>			

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<p>... and others:</p>			
<p>Supporting rescue operations when fishing boats are involved</p>			
			
<p>Zagreb (Croatia) 28/11/2011</p>	<p>Spanish - VMS</p>	<p>5 out of 42</p>	

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<p>... and others:</p>			
<p>Inquiring the causes of maritimes disasters</p>			
			
<p>Zagreb (Croatia) 28/11/2011</p>	<p>Spanish - VMS</p>	<p>6 out of 42</p>	



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VMS in Spain

... and others:

Cooperating with medical and technical assistance ships when fishing vessels are involved



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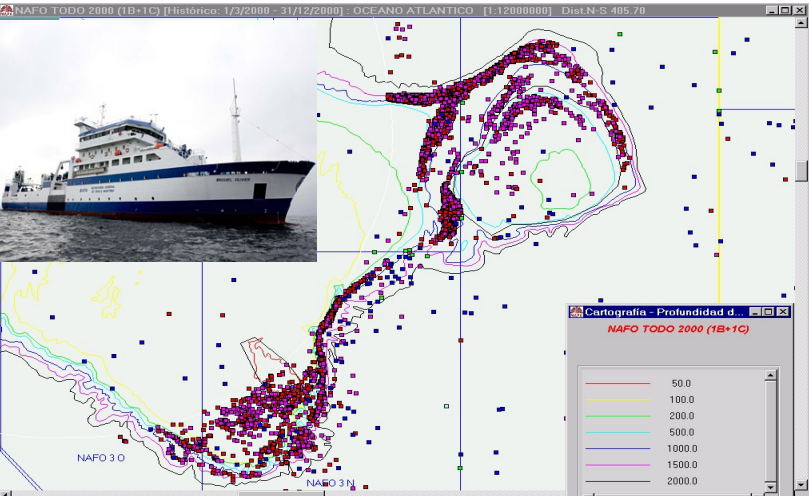
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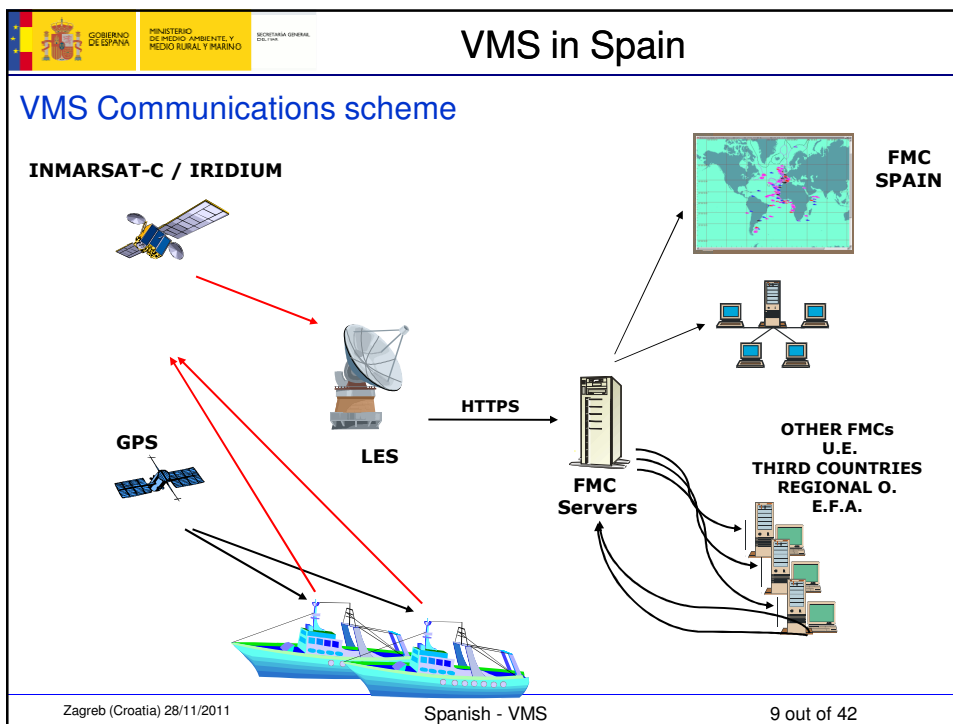
VMS in Spain



... and others:



Giving statistical data to research labs






Zagreb (Croatia) 28/11/2011
Spanish - VMS
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<p>On board tracking device (Overview 2/4):</p>			
<div style="display: flex; align-items: flex-start;">  <ul style="list-style-type: none"> • The Spanish VMS uses two different satellite systems: <ul style="list-style-type: none"> – Inmarsat-c – Iridium. • Both equipments are certified by official Organization. • The first new VMS equipment is subsidized. • Some vessels carry two VMS equipments. • Communication and repair costs are covered by the shipowner. </div>			
Zagreb (Croatia) 28/11/2011	Spanish - VMS	11 out of 42	

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<p>On board tracking device (Overview 3/4):</p>			
<div style="display: flex; align-items: flex-start;">  <ul style="list-style-type: none"> • Cost of 460 euros flat rate / year / vessel. • Tracking device unit strongly protected. • Special seal system in use. • Internal and exclusive GPS unit. • Full control of the devices from the FMC. • Restricted access serial port to the data channel. • Only specific technical personnel is authorised to manipulate the device. </div>			
Zagreb (Croatia) 28/11/2011	Spanish - VMS	12 out of 42	

			<h2>VMS in Spain</h2>
<p>On board tracking device (Overview 4/4): National Regulation Requirements:</p> <div style="display: flex; align-items: center;">  <ul style="list-style-type: none"> • Officially certified • Waterproof • Fitted to a bulkhead • Sealed • No easily tampered • Close to the Skipper area • Rugged external case. • Connected to two energy supply. </div>			
Zagreb (Croatia) 28/11/2011		Spanish - VMS	13 out of 42

			<h2>VMS in Spain</h2>
<p>Main characteristics of the Spanish FMC: Data collection, exploitation and distribution.</p> <ul style="list-style-type: none"> • Security & reliability on the system <ul style="list-style-type: none"> – Duplicity and redundance of data and FMC Servers / communication devices. – Digital certificates validating source and destination of information exchanged. • Confidentiality of the data <ul style="list-style-type: none"> – Encryption on data communication through https (digital certificates). – Restricted access to the data and the centre. • Automatization of control processes <ul style="list-style-type: none"> – Alarms, Events, Actions. • Data cross checking with other fisheries information systems <ul style="list-style-type: none"> – Fleet register – Licenses, authorizations, permits. – E.R.S Logbook – Sightings – Upcoming A.I.S. /VDS/... 			
Zagreb (Croatia) 28/11/2011		Spanish - VMS	14 out of 42

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SECRETARÍA GENERAL DEL MAR

VMS in Spain

VMS Data analysis:


EVENTS
Under certain conditions

↓

ALARMS
Notice to the operator

↓

ACTIONS
Measures taken by the operator



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VMS in Spain

Events:

- **SYSTEM Events:** Those incidents generated by the application and affecting the system function.
- **NAVIGATION Events:** Those incidents in the fishing activity detected by the FMC.

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VMS in Spain

Common examples on Events > Alarms:

```

graph TD
    A[ALARMS] --> B[SYSTEM:]
    A --> C[NAVIGATION:]
    
```

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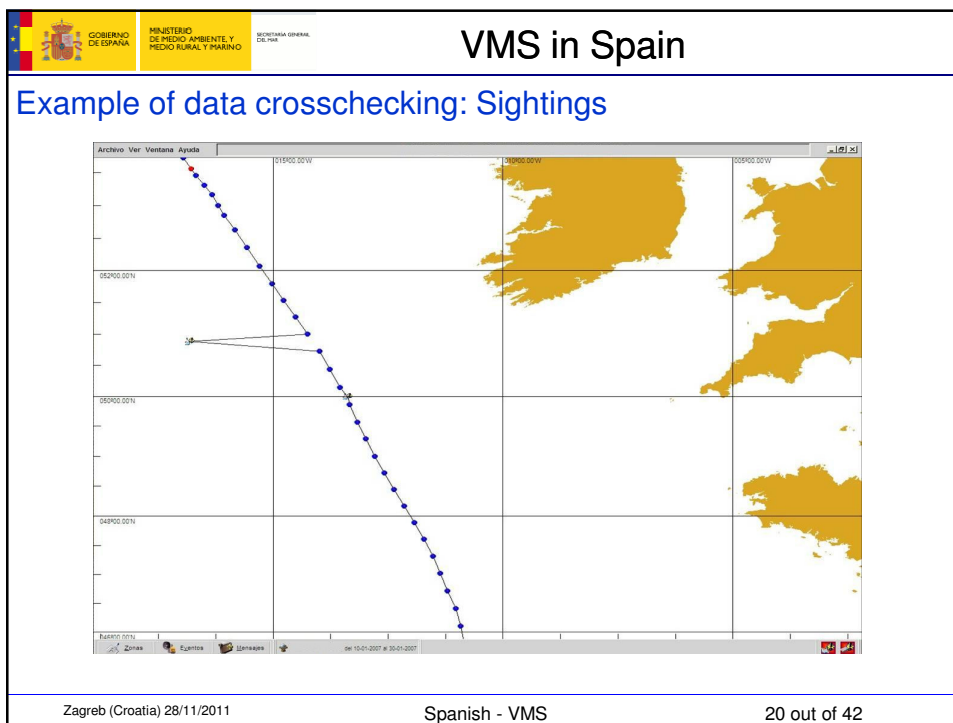
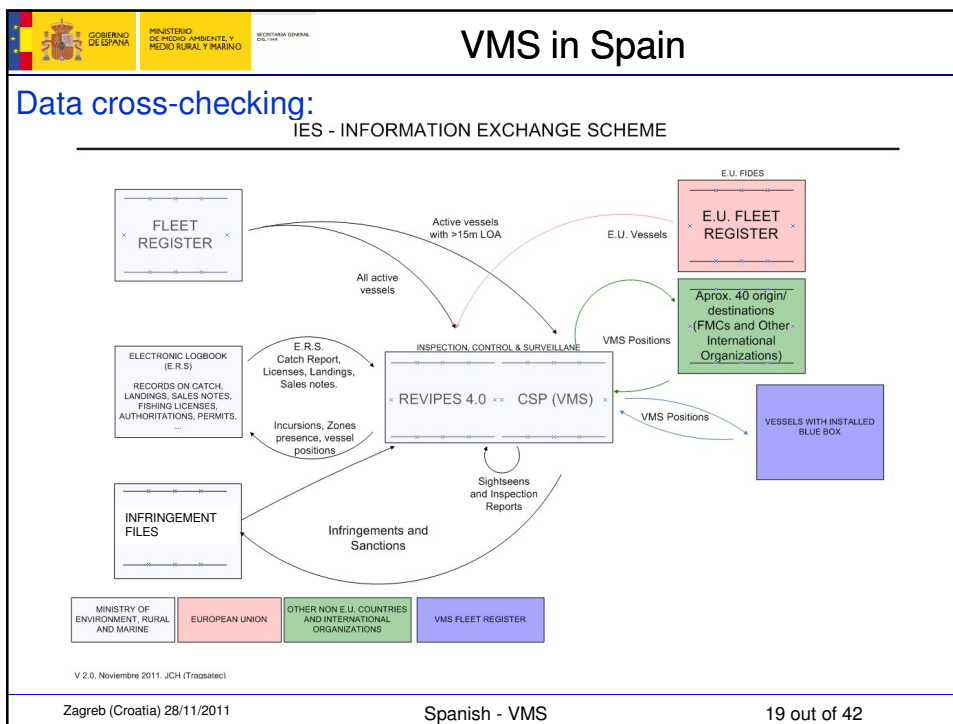
VMS in Spain

Actions:

- **SYSTEM:**
- -LOCATE THE EVENT.
- -COMMUNICATE TO OTHER FMCs IF NECESSARY.
- -REGISTER NEW VESSELS.
- -CHECK AND CORRECT COMMUNICATION ERRORS TO OTHER FMCs.

- **NAVIGATION:**
- FLEET ACTIVITY CONTROL.
- CONTROL OF THE ON BOARD TRACKING DEVICE FAILURES.
- REPROGRAMS (60', 120', ...)
- POSITION DUMPS
- POSITION DEMANDS (POLLING)
- CONTACT TO SHIPOWNERS AND FISHING ASSOCIATIONS
- INSPECTION REPORT

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VMS in Spain

Data distribution: FMC => Inspection means (24/7).

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VMS in Spain

Data distribution: Inspection means => FMC (24/7).

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SECRETARÍA GENERAL DE FISCALÍA

VMS in Spain

Some data about Spanish FMC

- 8.5 MILLIONS OF RECEIVED VMS MESSAGES / YEAR.
- FIRST E.U. MEMBER STATE BASED ON NUMBER OF F. VESSELS MONITORED.
- 2300 NATIONAL + 500 OTHER FLAGS VESSELS MONITORED.
- AVERAGE OF 250 INSPECTION FORM YEARLY .
- 4 FISHERIES INSPECTORS FULLY DEDICATED TO THE FMC.
- 15 CONSOLE OPERATORS SUPPORT 24/7 FISHERIES ACTIVITY CONTROL.

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SECRETARÍA GENERAL DE FISCALÍA

VMS in Spain

Some data about Spanish FMC: Servers infrastructure

Página 1

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SECRETARÍA GENERAL DEL MAR

VMS in Spain

Some data about Spanish FMC: Operators & Console



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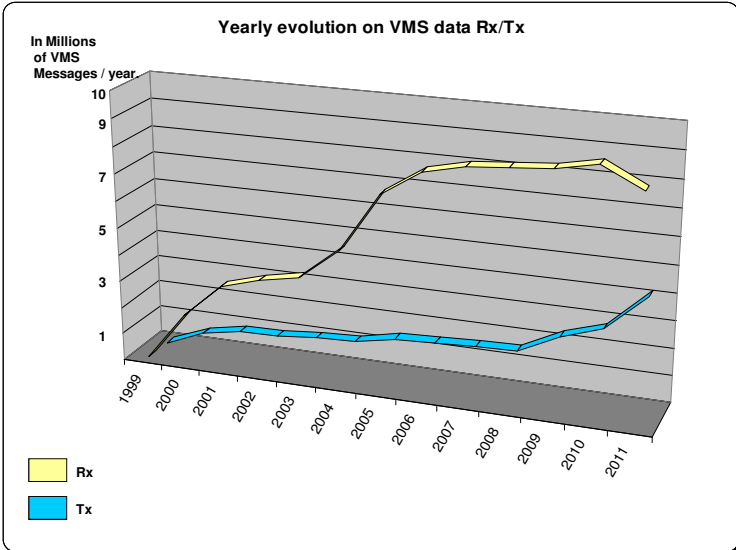


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VMS in Spain

Some data about Spanish FMC



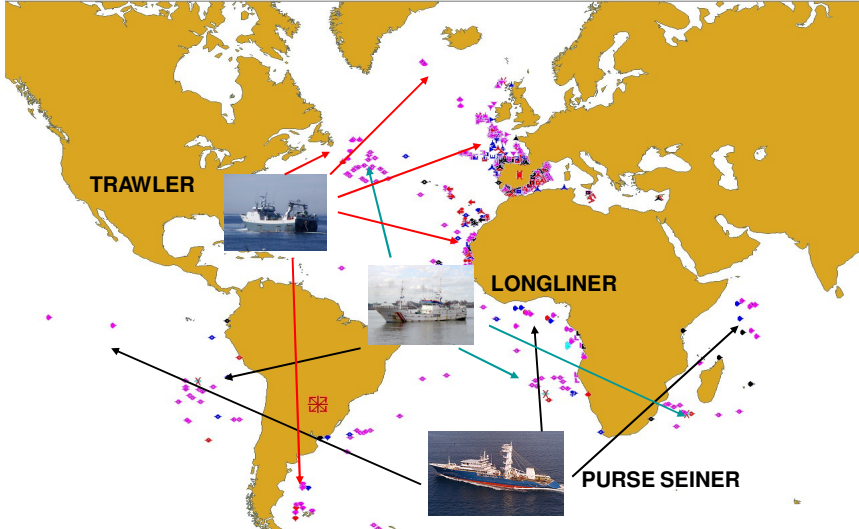
Year	Rx (Millions)	Tx (Millions)
1999	0.5	0.2
2000	1.0	0.3
2001	1.5	0.4
2002	2.0	0.5
2003	2.5	0.6
2004	3.5	0.7
2005	5.5	0.8
2006	7.0	1.0
2007	7.5	1.1
2008	7.5	1.1
2009	7.5	1.1
2010	7.5	1.2
2011	7.0	2.5


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VMS in Spain

Spanish worldwide fleet:

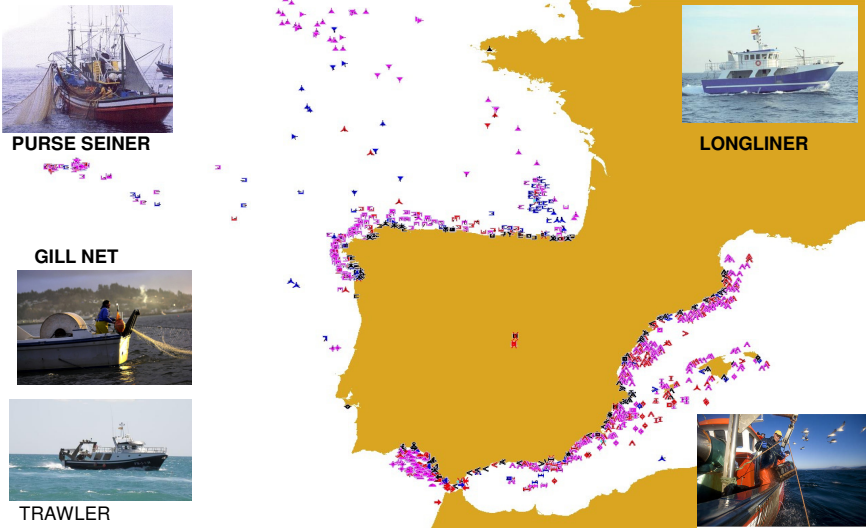


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VMS in Spain

Spanish coastal fleet:



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SECRETARÍA GENERAL DE PESCA

VMS in Spain

Graphical console - Icons colours:

Navegando ◆

V. Rango Pesca ◆

En puerto ◆

Volcado ◆

Posición manual ◆

B. Cruce pulsado ◆

Pescando ◆

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VMS in Spain

Graphical console - Fleet Icons (Gear & Fishery)

	ICO	CATEGORIA	OM		ICO	CATEGORIA	OM
CANTABRICO	⏏	ARRASTRE	2-C		⬆	ARRASTRE	1-F
	⏏	CERCO	2-C		⬆	ARTES MENORES	1-F
NOROESTE	⏏	ENMALLE Y ARTES MENORES	2-C	MARRUECOS	➡	CERCO	1-F
	⏏	PALANGRE DE FONDO	2-C		⬇	PALANGRE FONDO/SUPERFICIE	1-F
GOLFO DE CADIZ	⬆	ARRASTRE	2-D	MAURITANIA	⬆	ARRASTRE	1-G
	⬆	CERCO	2-D		⏏	PALANGRE	1-G
	⬆	ARTES MENORES	2-D		⬆	ARRASTRE	2-I
	⬆	ARRASTRE	2-E		TERCEROS	⏏	CERCO
MEDITERRANEO	➡	ENMALLE	2-E	PAISES	⬆	ARTES MENORES	2-I
	⏏	CERCO	2-E		⬆	PALANGRE FONDO/SUPERFICIE	2-I
	⏏	PALANGRE	2-E	ARRASTRE	⬆	ATLANTICO NORTE	1-B
	⏏	ALBORAN ARRASTRE	1-1-A		CONGELADOR	⬆	ATLANTICO SUR
CANARIAS	⏏	IBIZA ARRASTRE	1-1-I		⬆	CERCO CONGELADOR.	1-D
	⬆	TODAS LAS MODALIDADES	2-F		⬆	PALANGRE SUPERFICIE INTERNACIONAL	1-A
GRAN SOL	⬆	ARRASTRE	2-A	TUNIDOS	⬆	PALANGRE SUPERFICIE NACIONAL	2-G
	⬆	ENMALLE	2-A		⏏	ATUNEROS CAÑEROS	1-E
PORTUGAL	⏏	PALANGRE	2-A	EXTRANJEROS	⏏	REMOLCADORES Y AUXILIARES ATUN ROJO	2-E
	⬆	ARRASTRE	2-B		⬆	TODAS LAS MODALIDADES	EX

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VMS in Spain

Fishing patterns: Trawler

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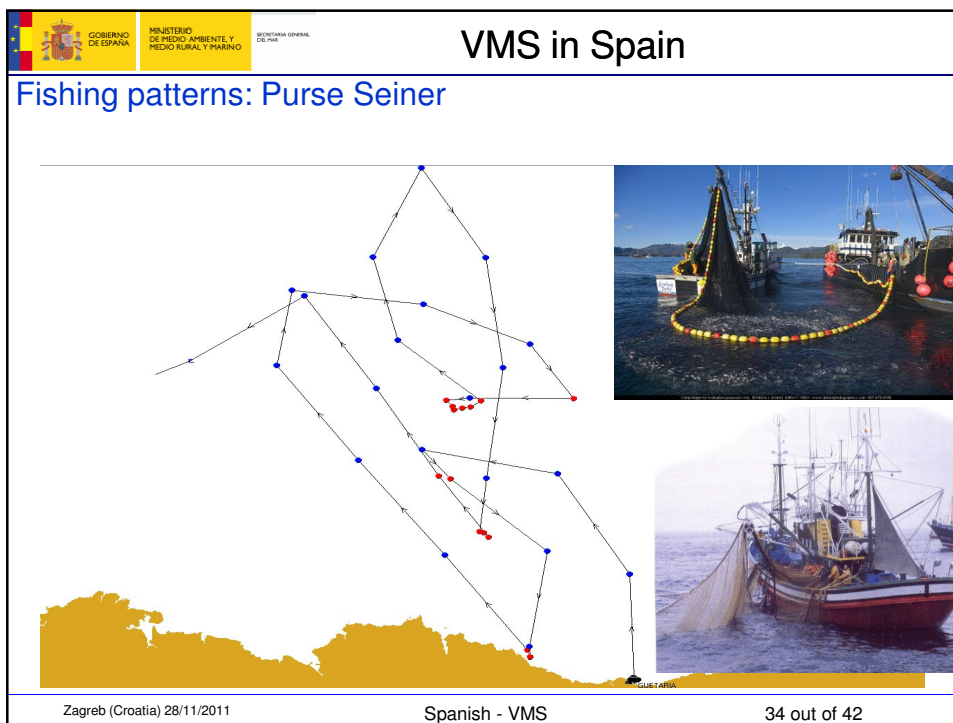
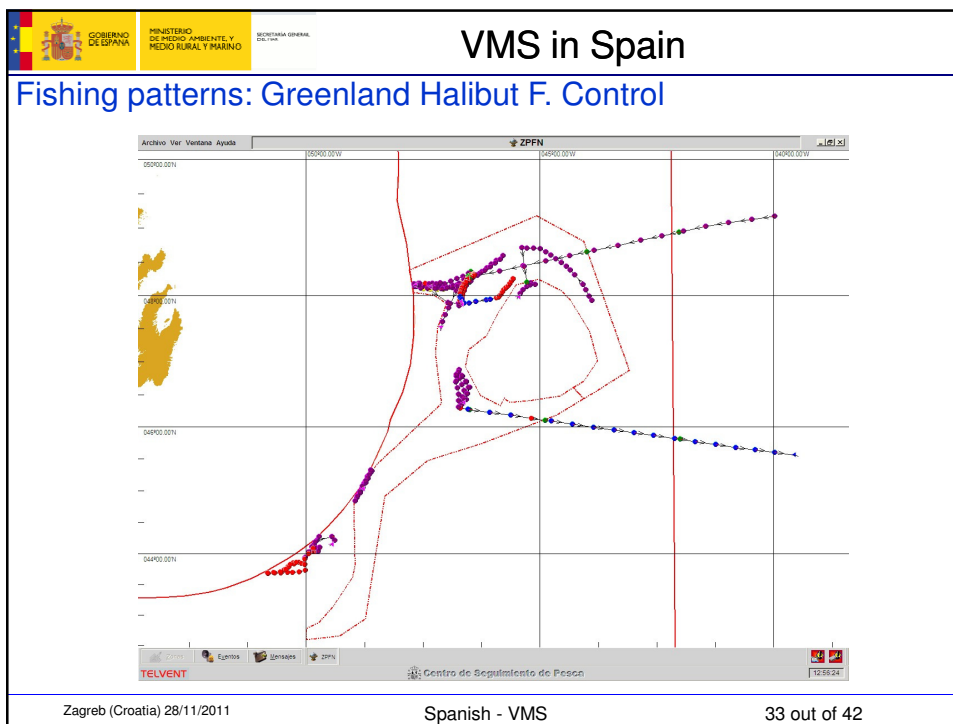
VMS in Spain

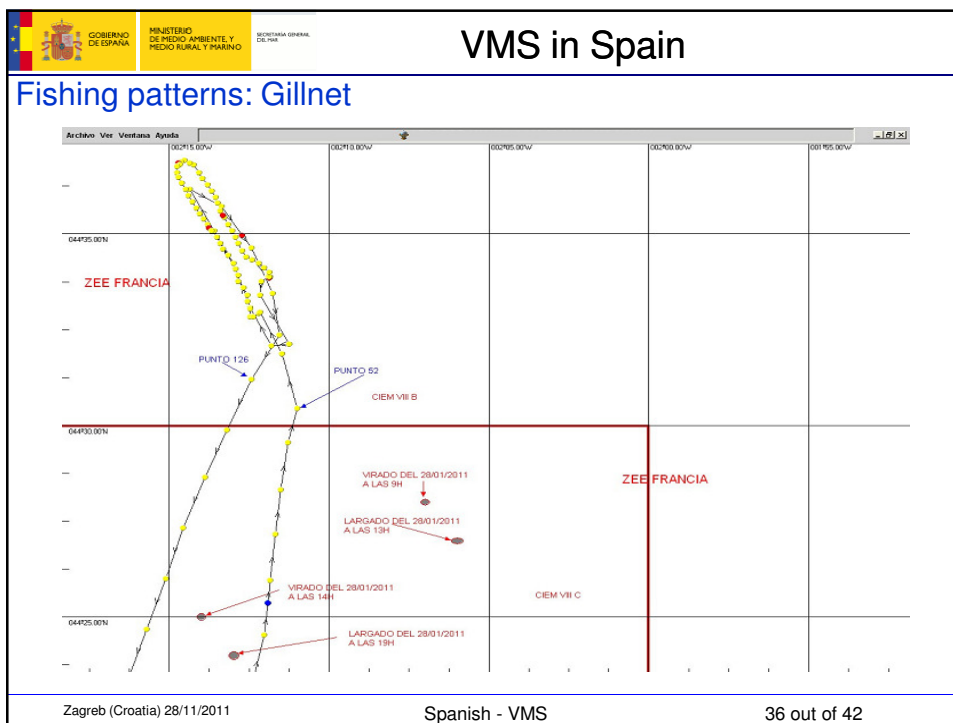
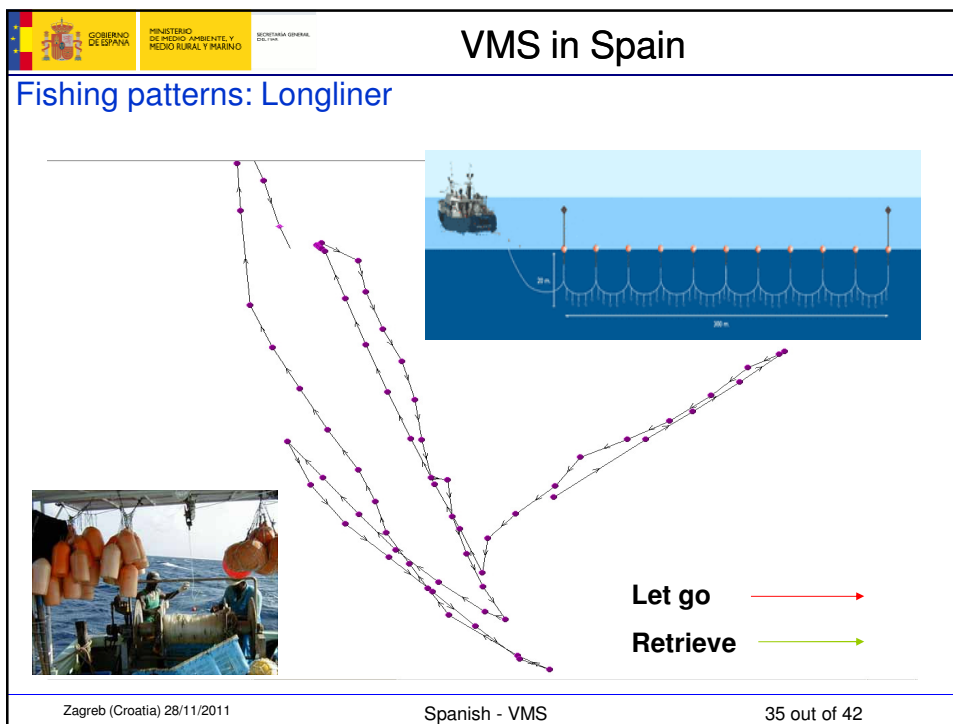
Fishing patterns: Pair Trawlers

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VMS in Spain

Fishing patterns: Tuna fishing & farming

The diagram illustrates the tuna farming and fishing process. It features a satellite image of a large circular tuna cage, a map of the Spanish coast highlighting the 'Fattening farm area' (near San Antonio, Bica, and La Serrina) and the 'Fishing area' (near San Sebastián and Portales). A red dotted line with arrows indicates the 'Tuna cage movement' from the farm area to the fishing area. Two photographs show fishing boats at sea and a large rectangular farm cage in the water.

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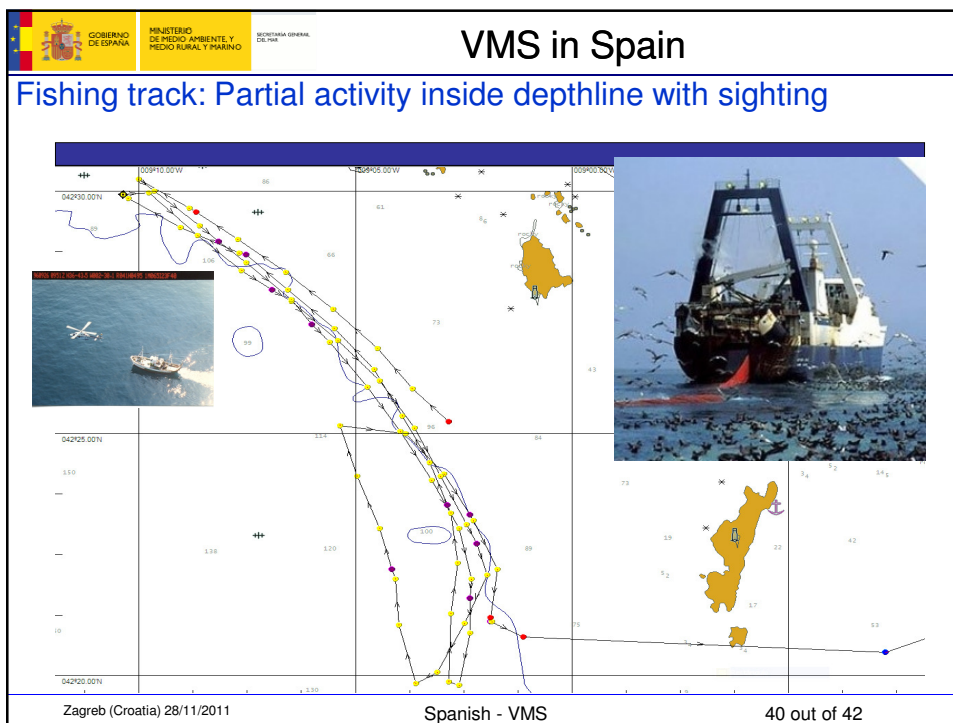
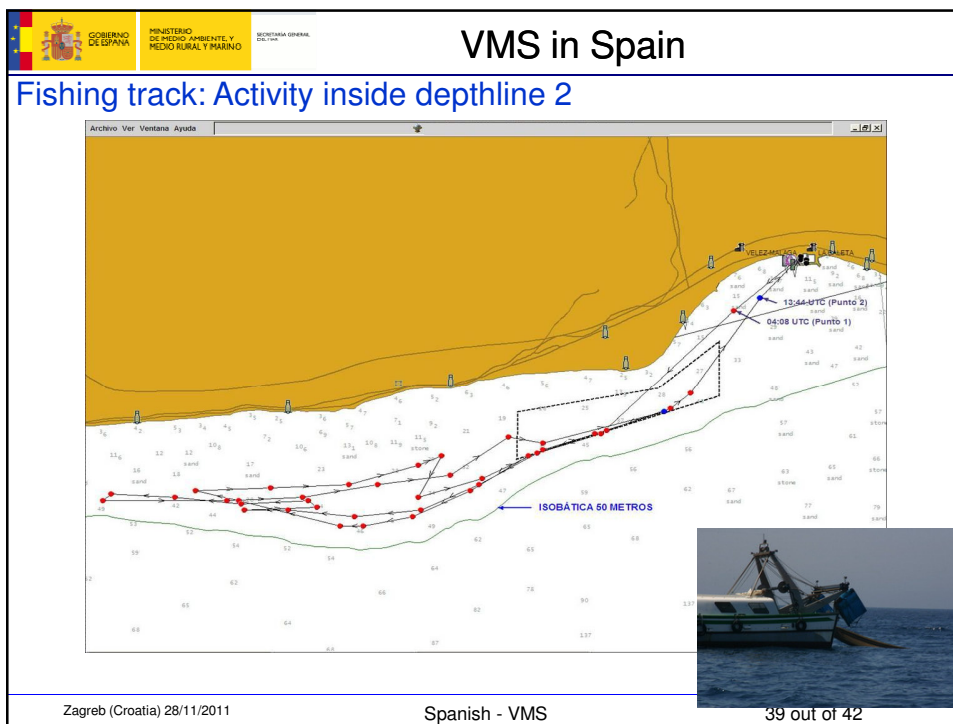
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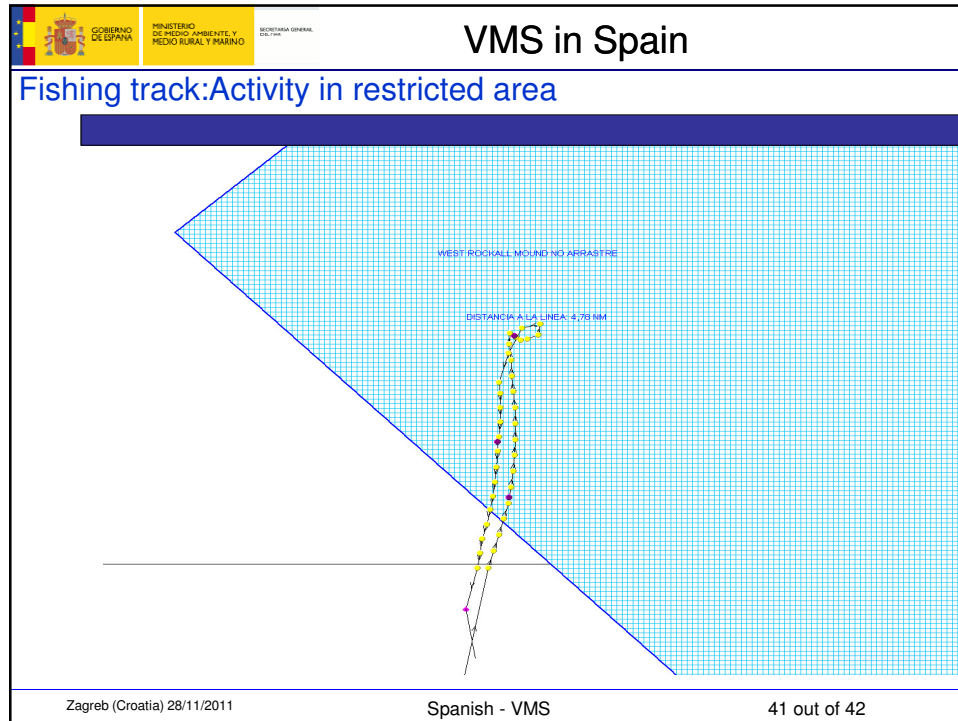
VMS in Spain

Fishing track: Activity inside depthline 1

The map displays a fishing track along the Spanish coast, marked with red and blue dots. The track starts near San Pedro del Pinero and San Pedro, moving south along the coast. An inset photograph shows a fishing vessel at sea.

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VMS in Spain

VMS Future

- Need to combine VMS with other control technologies to improve the efficiency of the fisheries surveillance, such as:
 - A.I.S. by VHF (coastal areas).
 - V.D.S.: vessel detection system using satellite radar images for distant offshore areas.
- - Sightings by conventional control systems.
- - Electronic Reporting System. Logbook

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VMS in Spain

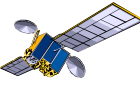
Fisheries control optimal formula



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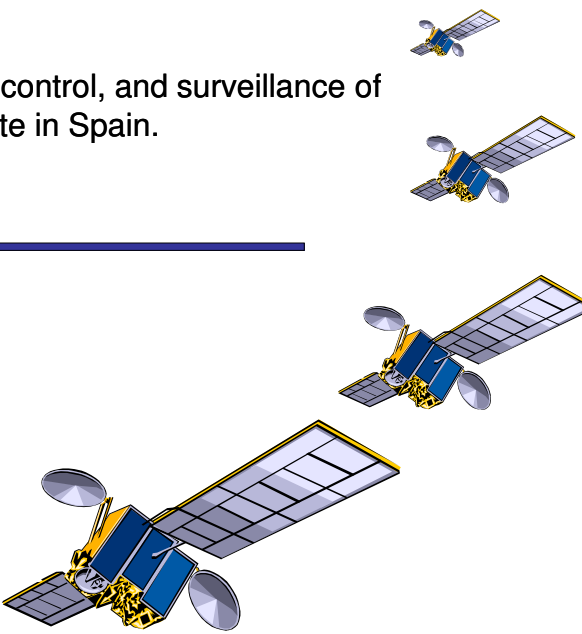
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VMS: monitoring, control, and surveillance of fisheries by satellite in Spain.

Thank you !

Hvala!

¡Gracias!



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