

1st IMDatE Meeting

IMDatE Functional Prototype

**Justino de Sousa
Senior Project Officer
Integrated Maritime Data**

Lisbon, 28th February 2012

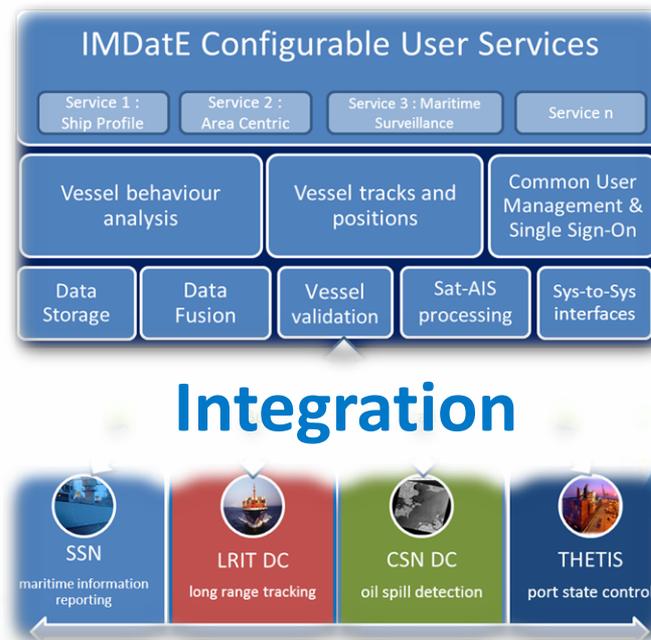
IMDatE Project Drivers

Main objectives:

1. To integrate existing maritime services (LRIT, SSN, CSN, THETIS) to fully exploit their cross-platform capabilities.
2. To develop value added services – on top of the integrated framework.

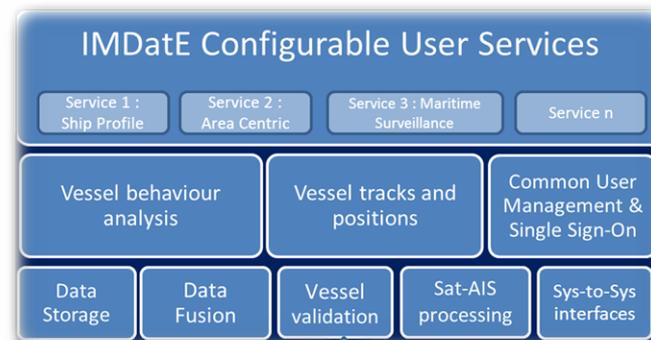
IMDatE as the integration of EMSA maritime applications

- Up-to-date technology and practices
- Improved interaction between EMSA applications
- Common services (enterprise level)
- Single-sign-on for all maritime applications
- Common management console
- Extended data sharing capabilities
- Easier to integrate new data sources
- Easier to develop pilot projects



IMDatE as the development of value – added services

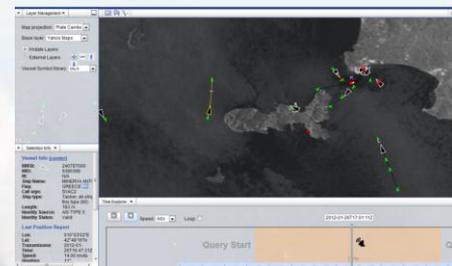
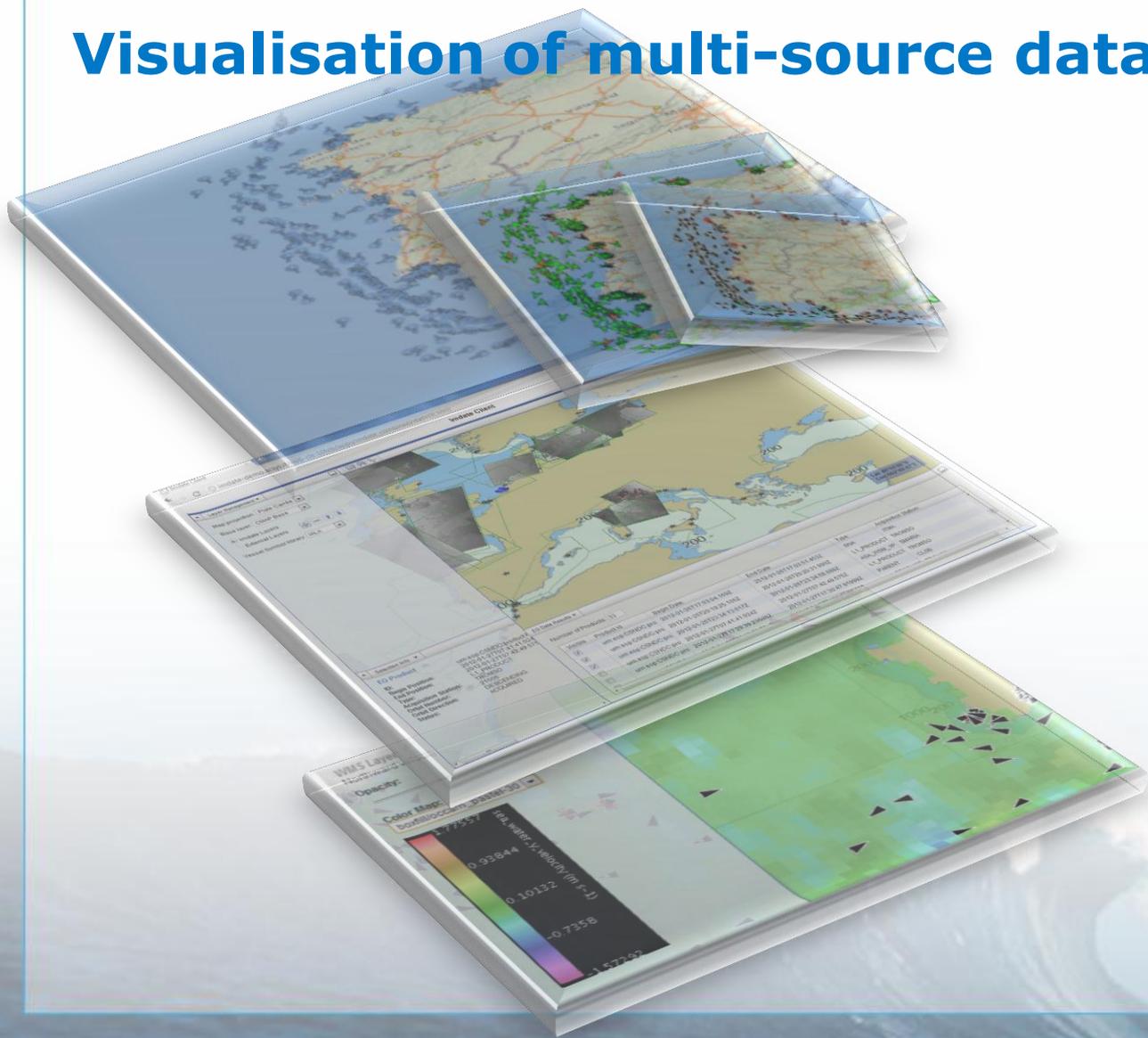
- A flexible processing engine to accommodate new and different types of data. Fused vessel positions and complete vessel track
- New machine-to-machine interfaces providing integrated data and services.
- Satellite AIS data centre
- Automated monitoring/watchdog and alerting features (by email or dedicated interfaces)
- Innovative user interface - a single visualisation interface with various types of data, not just position information.



Value added services



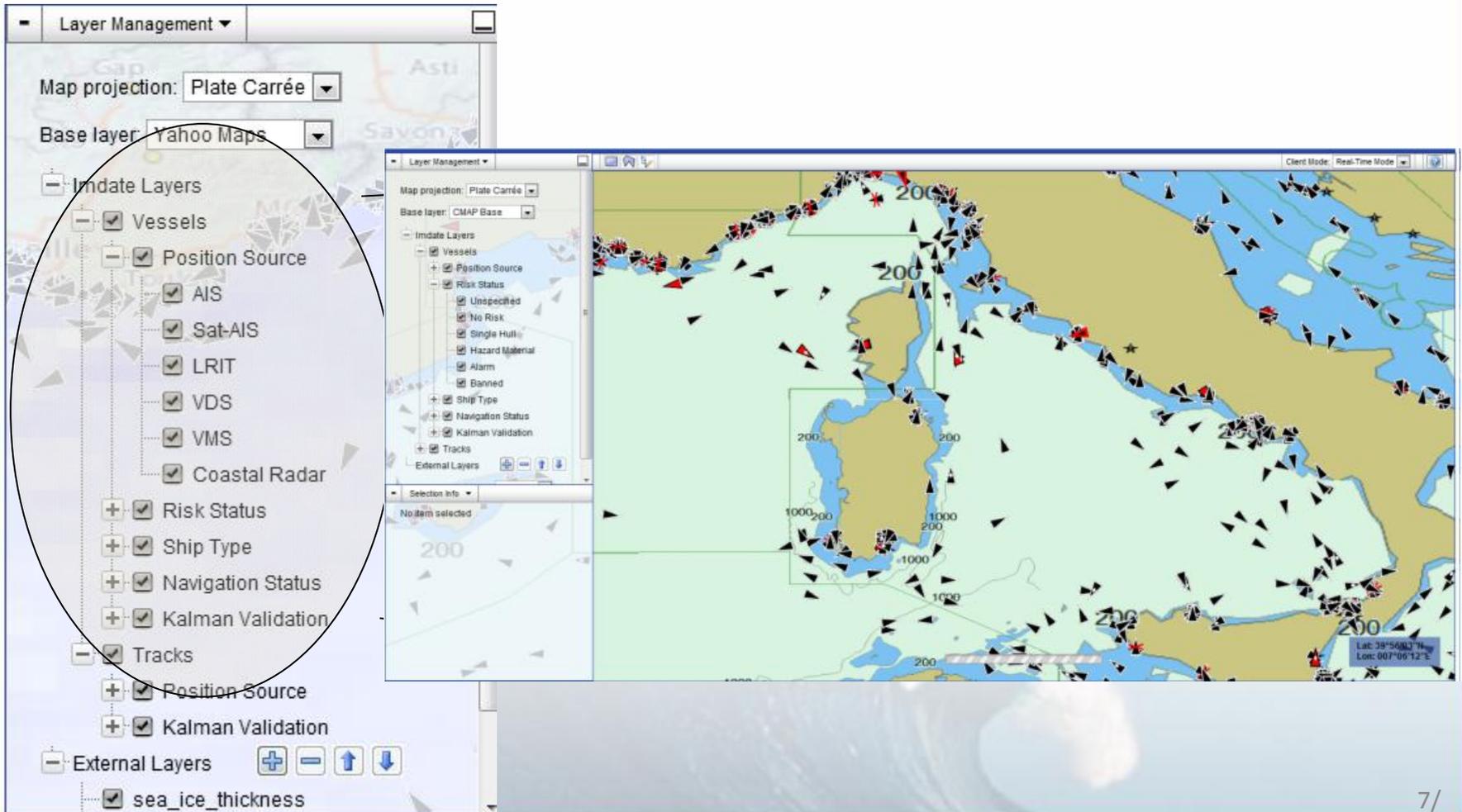
Visualisation of multi-source data



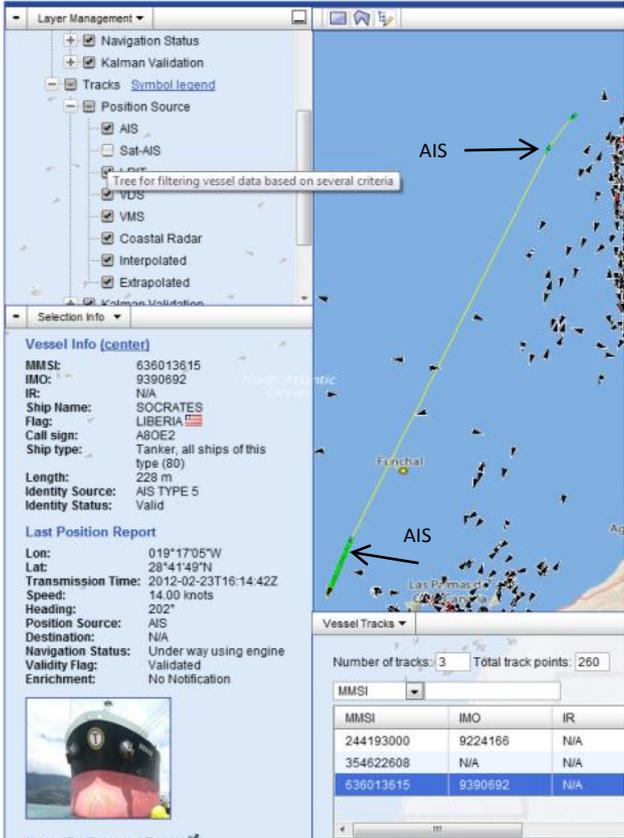
Combining maritime data – first level

- Last known vessel position from multiple data sources:
 - AIS + LRIT + S-AIS + VMS + coastal radar + satellite radar
- Ship tracks:
 - Generation of ship track based on single source of position reports
 - Generation of ship track based on multiple types of position reports.
 - Correlation of satellite radar and coastal radar detected vessels with other position report sources to establish identified/non-identified vessels.

Visualisation filters for last reported position

The image shows a screenshot of a software interface for managing map layers. The main window is titled "Layer Management" and displays a map of the Mediterranean coast. A secondary window is overlaid on the left, showing a detailed list of filters for the "Vessels" layer. The filters are organized into expandable sections: "Position Source", "Risk Status", "Ship Type", "Navigation Status", "Kalman Validation", "Tracks", and "External Layers". Each filter has a checkbox, and many are checked. A large black oval highlights the "Position Source" section in the secondary window. The map in the background shows numerous vessel icons (black triangles) plotted on a map with depth contours (200, 1000 meters) and a coastline. The interface includes a "Map projection" dropdown set to "Plate Carrée" and a "Base layer" dropdown set to "Yahoo Maps". The secondary window's "Base layer" is set to "CMAP Base". The "Selection info" panel at the bottom of the secondary window shows "No item selected". The main window's "Client Mode" is set to "Real-Time Mode".

Mock-up: Single and multi-source ship tracks (1 of 2)



Layer Management

- Navigation Status
- Kalman Validation
- Tracks **Symbol Legend**
 - Position Source
 - AIS
 - Sat-AIS
 - Tree for filtering vessel data based on several criteria
 - VDS
 - VMS
 - Coastal Radar
 - Interpolated
 - Extrapolated

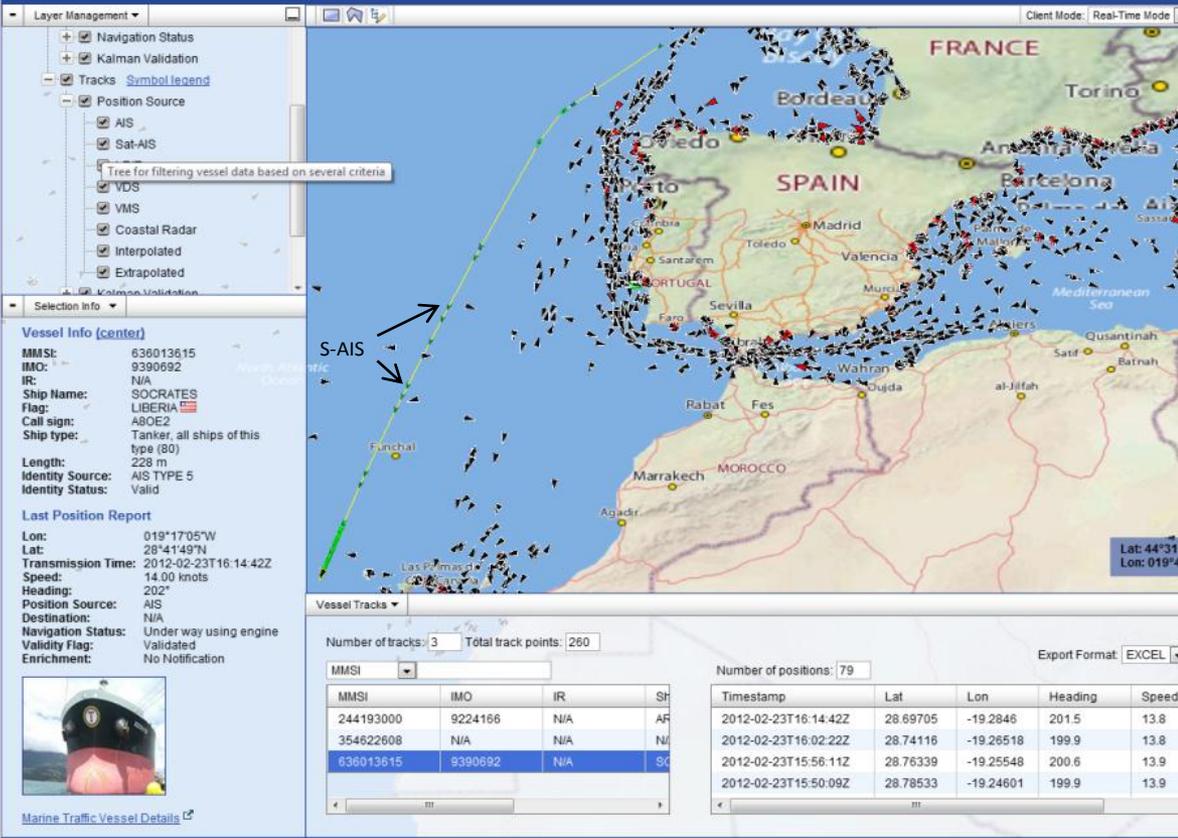
Vessel Info (center)

MMSI: 636013615
 IMO: 9390692
 IR: N/A
 Ship Name: SOCRATES
 Flag: LIBERIA
 Call sign: A8OE2
 Ship type: Tanker, all ships of this type (80)
 Length: 228 m
 Identity Source: AIS TYPE 5
 Identity Status: Valid

Last Position Report

Lon: 019°17'05"W
 Lat: 28°41'49"N
 Transmission Time: 2012-02-23T16:14:42Z
 Speed: 14.00 knots
 Heading: 202°
 Position Source: AIS
 Destination: N/A
 Navigation Status: Under way using engine
 Validity Flag: Validated
 Enrichment: No Notification

MMSI	IMO	IR
244193000	9224166	N/A
354822608	N/A	N/A
636013615	9390692	N/A



Layer Management

- Navigation Status
- Kalman Validation
- Tracks **Symbol Legend**
 - Position Source
 - AIS
 - Sat-AIS
 - Tree for filtering vessel data based on several criteria
 - VDS
 - VMS
 - Coastal Radar
 - Interpolated
 - Extrapolated

Vessel Info (center)

MMSI: 636013615
 IMO: 9390692
 IR: N/A
 Ship Name: SOCRATES
 Flag: LIBERIA
 Call sign: A8OE2
 Ship type: Tanker, all ships of this type (80)
 Length: 228 m
 Identity Source: AIS TYPE 5
 Identity Status: Valid

Last Position Report

Lon: 019°17'05"W
 Lat: 28°41'49"N
 Transmission Time: 2012-02-23T16:14:42Z
 Speed: 14.00 knots
 Heading: 202°
 Position Source: AIS
 Destination: N/A
 Navigation Status: Under way using engine
 Validity Flag: Validated
 Enrichment: No Notification

MMSI	IMO	IR	SI
244193000	9224166	N/A	AF
354822608	N/A	N/A	NI
636013615	9390692	N/A	SI

Timestamp	Lat	Lon	Heading	Speed
2012-02-23T16:14:42Z	28.69705	-19.2846	201.5	13.8
2012-02-23T16:02:22Z	28.74116	-19.26518	199.9	13.8
2012-02-23T15:56:11Z	28.76339	-19.25548	200.6	13.9
2012-02-23T15:50:09Z	28.78533	-19.24601	199.9	13.9

AIS only

AIS and S-AIS

Mock-up: Single and multi-source ship tracks (2 of 2)

Imdate Client

imdate-demo.acsys.it/imdate-fat-0.2/apps/imdate_combined/staticGL.html#

Imdate Client Login

Get vessel track Client Mode: Query Mode

Begin Date: 2012-01-21T00:00:00Z

End Date: 2012-02-22T00:00:00Z

Advanced options:

Sources: ALL

Kalman Filtering:

Fuse and smooth

Extrapolate

Extrapolation duration (min): 30

Step (s): 60

Submit

Selection Info

Vessel Info (center)

MMSI: 205400000

IMO: 9272383

IR: N/A

Ship Name: MINERAL BEIJING

Flag: BELGIUM

Call sign: ONAR

Ship type: Cargo, all ships of this type (70)

Length: -223 m

Identity Source: AIS TYPE 5

Identity Status: Valid

Last Position Report

Lon: 040°41'16"W

Lat: 29°22'54"N

Transmission Time: 2012-02-20T13:58:40Z

Speed: 11.60 knots

Heading: 82°

Position Source: Sat-AIS

Destination: N/A

Navigation Status: N/A

Validity Flag: Validated

Enrichment: No Notification



AIS, Satellite AIS, and LRIT

AIS

S-AIS

LRIT

Map showing ship tracks over the Atlantic Ocean near Portugal.

Vessel Tracks

Number of tracks: 1 Total track points: 228

MMSI: 205400000

MMSI	IMO	IR	Ship
205400000	9272383	N/A	MIN

Number of positions: 228

Export Format: EXCEL

Timestamp	Lat	Lon	Heading	Speed
2012-02-20T13:58:40Z	29.38155	-40.68767	82	11.6
2012-02-20T02:02:00Z	28.52503	-43.08072	67	11.4
2012-02-20T00:23:10Z	28.40287	-43.40933	66	11.5
2012-02-19T13:33:32Z	27.5835	-45.533	64	11.5

<< first < prev 1 2 3 next > last >>

Mock-up: AIS and S-AIS reports with track interpolation

Get vessel track
Client Mode: Query Mode

Vessel: MMSI 352879000

Begin Date: 2012-02-12T00:00:00Z

End Date: 2012-02-15T11:00:00Z

Advanced options:

Sources: ALL

Kalman Filtering:

Fuse and smooth

Extrapolate

Extrapolation duration (min): 30

Step (s): 60

Submit

Selection info

Flag: PANAMA

Call sign: 3EAG4

Ship type: Other Type, all ships of this type (90)

Length: 199 m

Identity Source: AIS TYPE 5

Identity Status: Valid

Last Position Report

Lon: 016°29'08"E

Lat: 35°10'08"N

Transmission Time: 2012-02-15T10:17:55Z

Speed: 15.90 knots

Heading: 106°

Position Source: Sat-AIS

Destination: N/A

Navigation Status: N/A

Validity Flag: Validated

Enrichment: No Notification



Marine Traffic Vessel Details



AIS S-AIS

Lat: 34°47'31"N

Lon: 002°42'58"E

Vessel Tracks

Number of tracks: 1 Total track points: 5068

MMSI: 352879000

MMSI	IMO	IR	SH
352879000	9284776	N/A	CF

Number of positions: 5068

Export Format: EXCEL

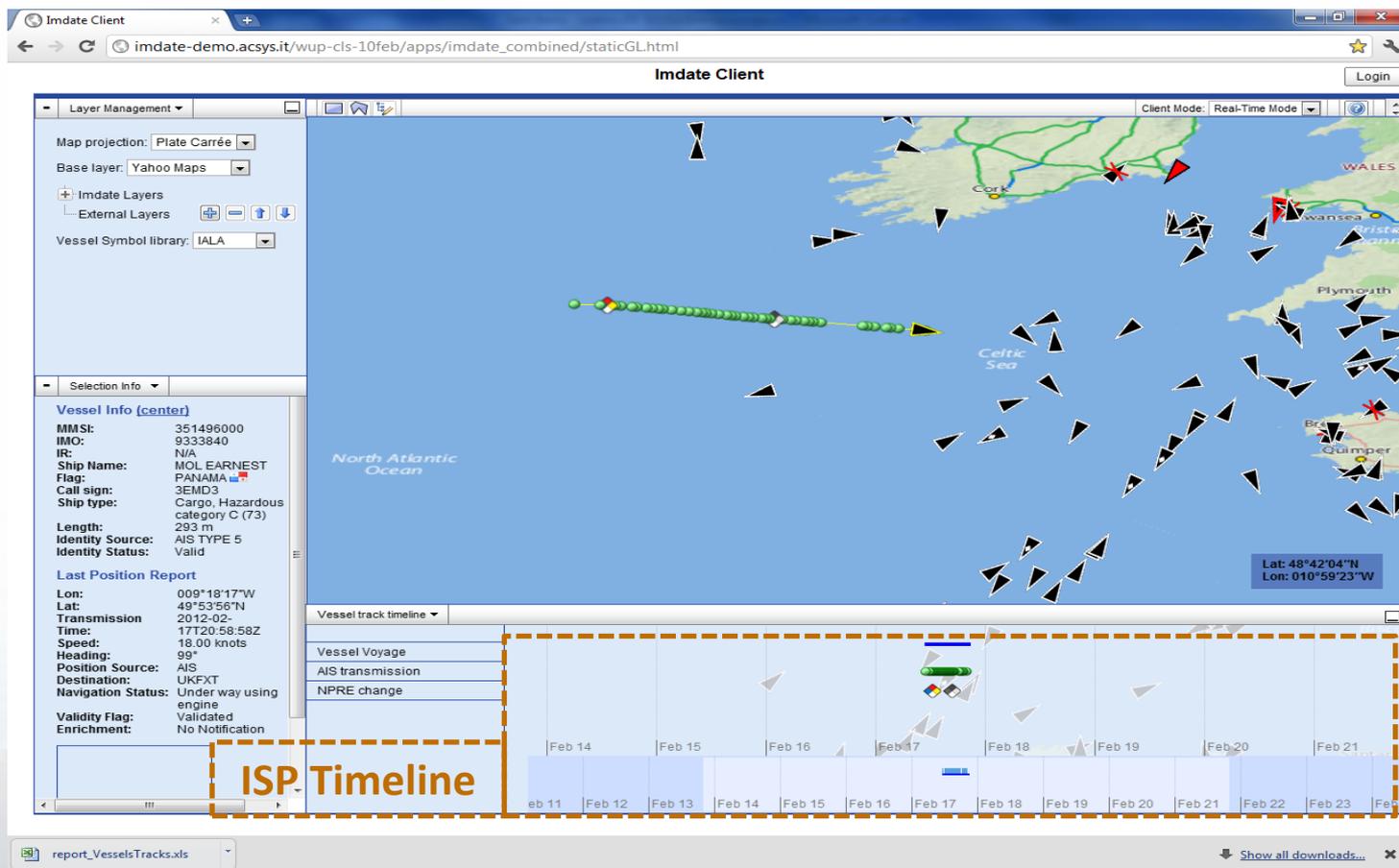
Timestamp	Lat	Lon	Heading	Speed
2012-02-13T04:05:03Z	36.52	-0.73	80.44	7.41
2012-02-13T04:04:03Z	36.52	-0.74	80.25	7.60
2012-02-13T04:03:03Z	36.52	-0.74	80.02	8.15
2012-02-13T04:02:03Z	36.52	-0.75	79.77	9.08

<< first < prev 29 30 31 32 33 34 35 36 37 38 next > last >>

Combining maritime data – second level

- *Integrated Ship Profile*
 - A single operation to aggregate information on a vessel from all EMSA applications.
 - SSN notifications, THETIS - SRP, Priority of inspection etc.
 - May be supported through a machine-to-machine interface or through the IMDatE graphical interface.
 - A 'Timeline' tool to provide better awareness of temporal events and information.
- *Area Centric*
 - Any position related information and ship tracks
 - Overlay of satellite images
 - Correlation for satellite detected vessels (VDS)
 - Checking detected vessel position against position reports.
 - External information layers (oceanographic and meteorological information, ad-hoc external information sources)

Mock-up: Integrated Ship Profile



Imdate Client

Client Mode: Real-Time Mode

Map projection: Plate Carrée
Base layer: Yahoo Maps
Vessel Symbol library: IALA

Vessel Info (center)

- MMST: 351496000
- IMO: 9333840
- IR: N/A
- Ship Name: MOL EARNEST
- Flag: PANAMA
- Call sign: 3EMD3
- Ship type: Cargo, Hazardous category C (73)
- Length: 293 m
- Identity Source: AIS TYPE 5
- Identity Status: Valid

Last Position Report

- Lon: 009°18'17"W
- Lat: 49°53'56"N
- Transmission: 2012-02-
- Time: 17120:58:58Z
- Speed: 18.00 knots
- Heading: 99°
- Position Source: AIS
- Destination: UKFXT
- Navigation Status: Under way using engine
- Validity Flag: Validated
- Enrichment: No Notification

ISP Timeline

Vessel track timeline

- Vessel Voyage
- AIS transmission
- NPRE change

Feb 14 Feb 15 Feb 16 Feb 17 Feb 18 Feb 19 Feb 20 Feb 21 Feb 22 Feb 23 Feb 24

report_VesselsTracks.xls Show all downloads...

In addition to the map view, a 'Timeline' tool may provide better awareness of time related events/information. Clicking on an element in the timeline would refocus on the relevant part of the map.

Mock-up: Visualisation of satellite imagery

Imdate Client

imdate-demo.acsys.it/wup-cis-10feb/apps/imdate_combined/staticGL.html

Imdate Client Login

Layer Management Client Mode: Query Mode

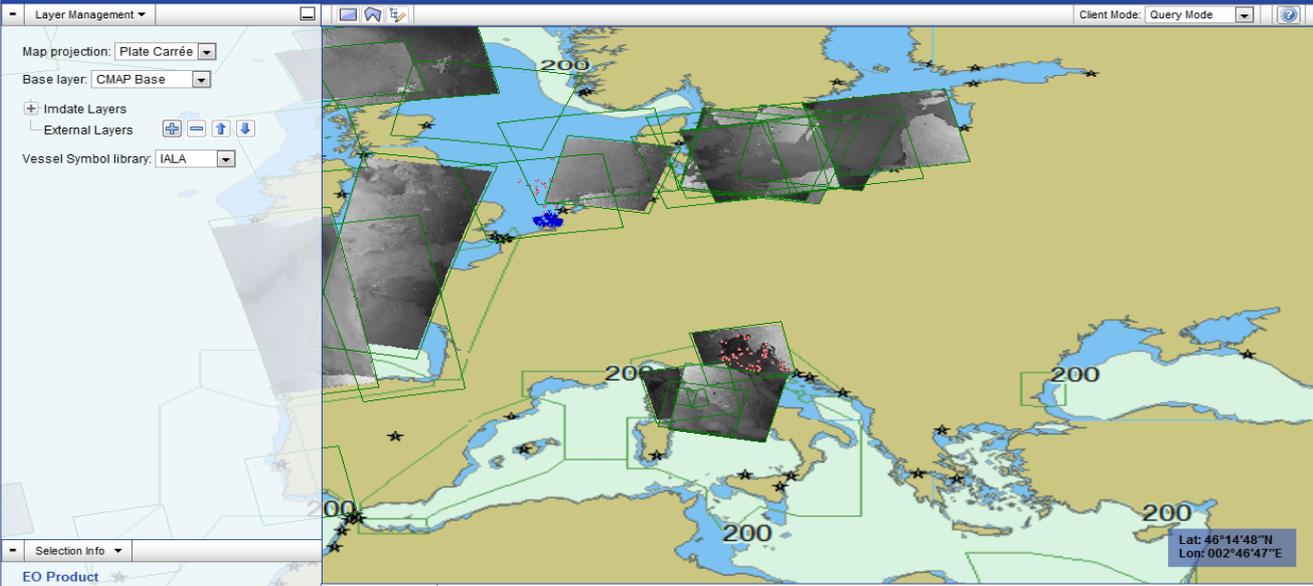
Map projection: Plate Carrée

Base layer: CMAP Base

Imdate Layers

External Layers

Vessel Symbol library: IALA



Selection Info

EO Product

ID: urn:eop:CSNDC:product:2012-01-27T07:41:41.024
 Begin Position: 2012-01-27T07:42:49.575
 End Position:
 Type: L1_PRODUCT
 Acquisition Station: TROMSO
 Orbit Number: 21505
 Orbit Direction: DESCENDING
 Status: ACQUIRED

EO Data Results

Number of Products: 33

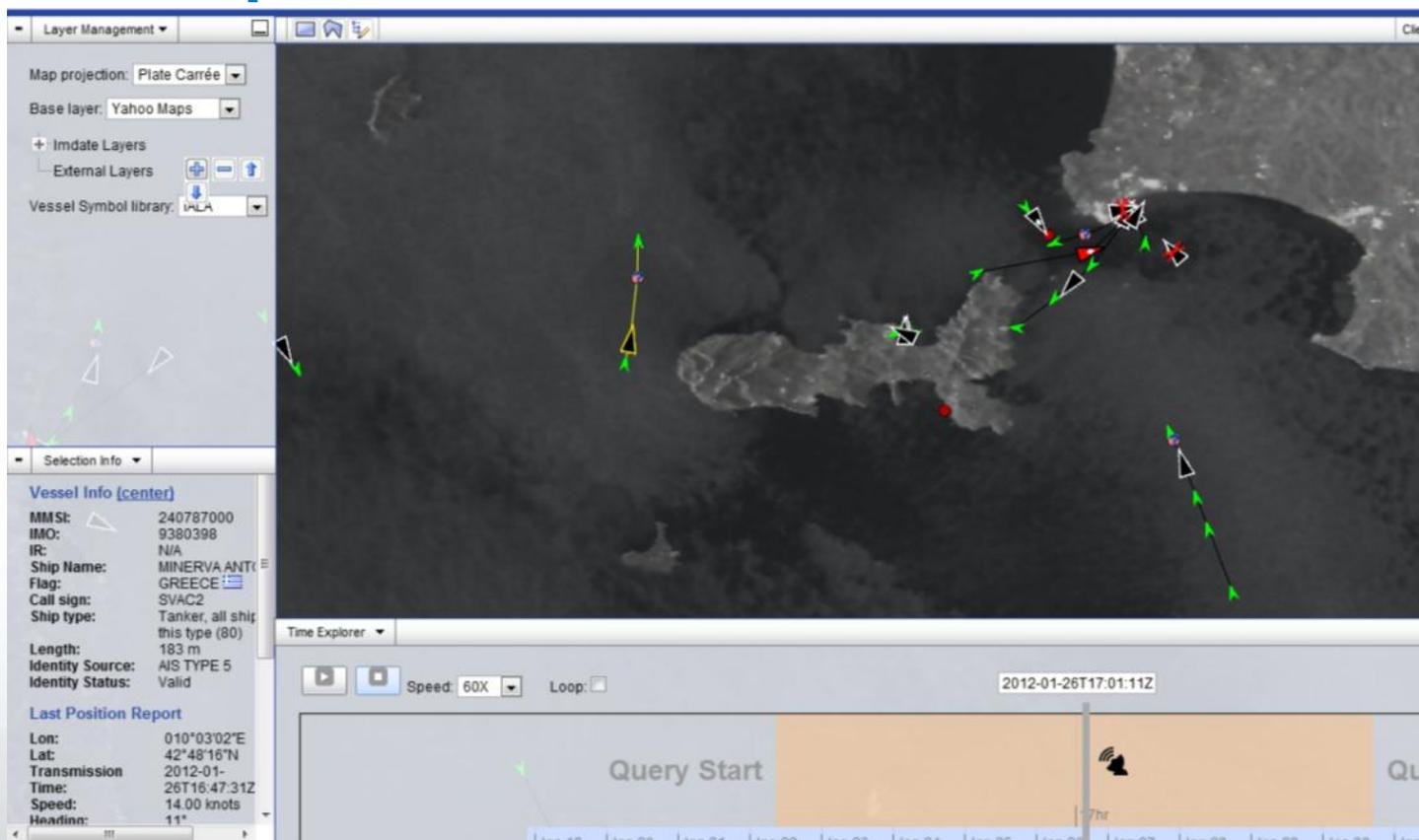
Visible	Product Id	Begin Date:	End Date:	Type:	Acquisition Station:
<input checked="" type="checkbox"/>	urn:eop:CSNDC:pro	2012-01-26T17:03:04.169Z	2012-01-26T17:03:51.453Z	SNA	ITMA
<input checked="" type="checkbox"/>	urn:eop:CSNDC:pro	2012-01-26T20:19:25.105Z	2012-01-26T20:20:31.990Z	L1_PRODUCT	TROMSO
<input checked="" type="checkbox"/>	urn:eop:CSNDC:pro	2012-01-26T23:34:13.017Z	2012-01-26T23:34:58.688Z	ASA_WSM_1P	SMARIA
<input type="checkbox"/>	urn:eop:CSNDC:pro	2012-01-27T07:41:41.024Z	2012-01-27T07:42:49.575Z	L1_PRODUCT	TROMSO
<input type="checkbox"/>	urn:eop:CSNDC:pro	2012-01-27T17:29:39.23606Z	2012-01-27T17:30:47.91998Z	PARENT	CLSB

Lat: 46°14'48"N
 Lon: 002°46'47"E



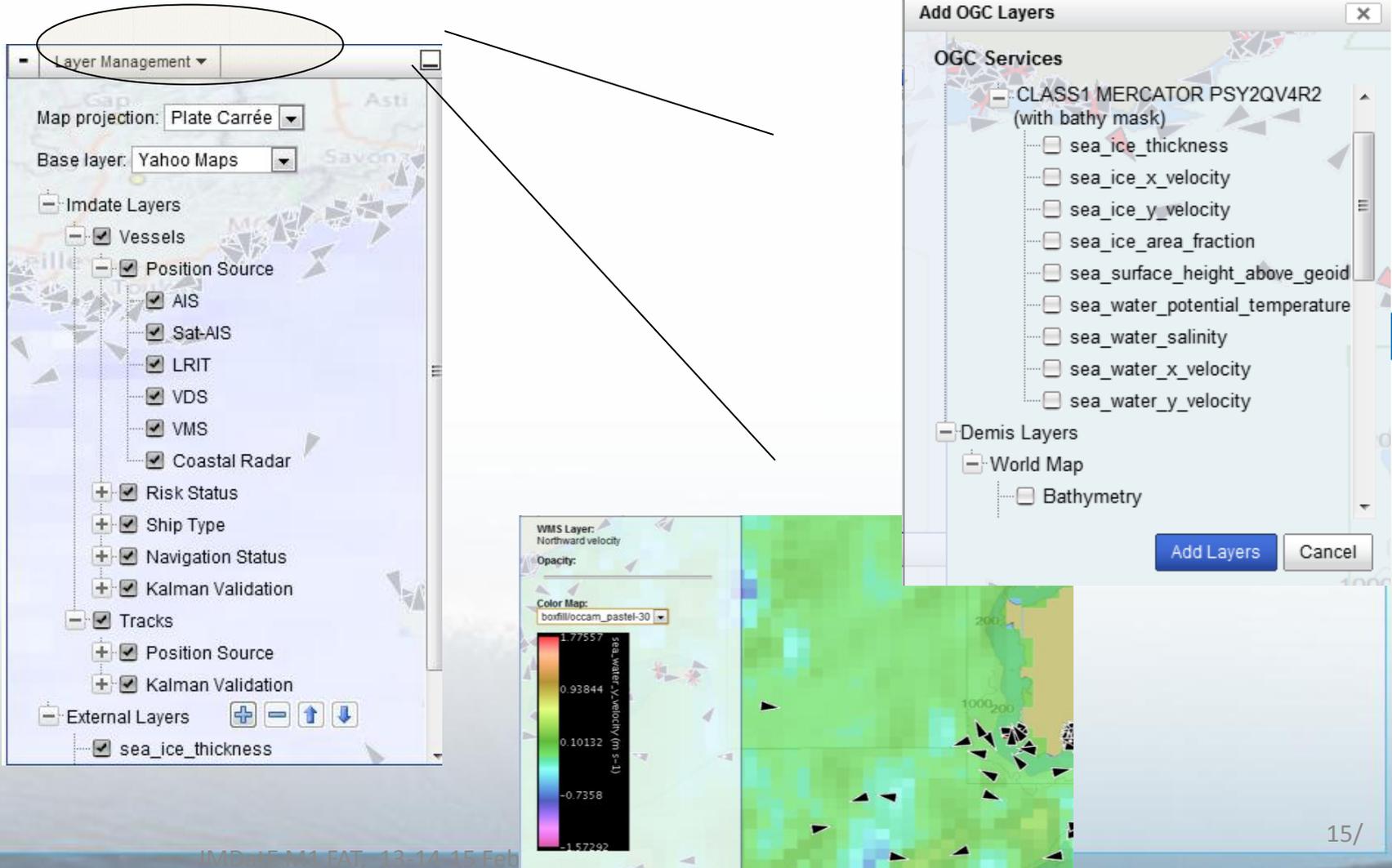
Lat	Lon	Altitude	Speed	Heading	Position Source	Destination	Navigation Status	Validity Flag	Icon
46.246667	2.780556	10	10.2	112.0	GPS	ITMA	Under way using engine	0	Ship

Correlation between satellite detected vessels and ship position reports



A graphical interface may provide “time slider” visualization for correlation inspection

Visualisation of external information



The screenshot displays a maritime information system interface with the following components:

- Layer Management Panel:** Located on the left, it includes a dropdown menu for "Layer Management" (circled in red), "Map projection: Plate Carrée", "Base layer: Yahoo Maps", and a tree view of layers. The "External Layers" section is expanded to show "sea_ice_thickness".
- Add OGC Layers Dialog:** A window on the right titled "Add OGC Layers" showing a list of "OGC Services" under "CLASS1 MERCATOR PSY2QV4R2 (with bathy mask)". The list includes various parameters such as "sea_ice_thickness", "sea_ice_x_velocity", "sea_ice_y_velocity", "sea_ice_area_fraction", "sea_surface_height_above_geoid", "sea_water_potential_temperature", "sea_water_salinity", "sea_water_x_velocity", and "sea_water_y_velocity". There are also "Demis Layers" like "World Map" and "Bathymetry". Buttons for "Add Layers" and "Cancel" are at the bottom.
- External Data Visualization:** A zoomed-in view at the bottom center shows a "WMS Layer: Northward velocity" with a "Color Map" legend. The legend ranges from -1.57282 to 1.77557. The visualization shows a heatmap of sea water velocity with a color scale from purple (negative) to red (positive).



THANK YOU !

European Maritime Safety Agency

**EMSA IMDatE Team
imdate@emsa.europa.eu**

