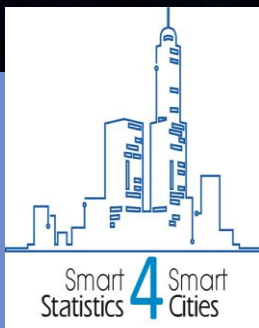




Hellenic Statistical Authority (ELSTAT)

Tracking ships using AIS data – A visualized example in the area of Kalamata

Christina Pierrakou – Eleni Bisioti
ELSTAT – 5.10.2018



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Overview

Introduction

Automatic Identification System (AIS)

Define ship's journey

Visualization

AIS meets IoT

Next Steps



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Introduction

Research on the use of AIS data for official statistics was part of the ESSnet Big Data project, performed by The Netherlands (Work package leader), Greece, Poland, Norway and Denmark.

CSO
CBS
NSI
DS
INED
ARESS
F
GUSI
STAT
STAT
SCB
DESTAT
STAT
INSEL
STAT
SEE
SOES
INSE
SSB
SURS
SB
ONS

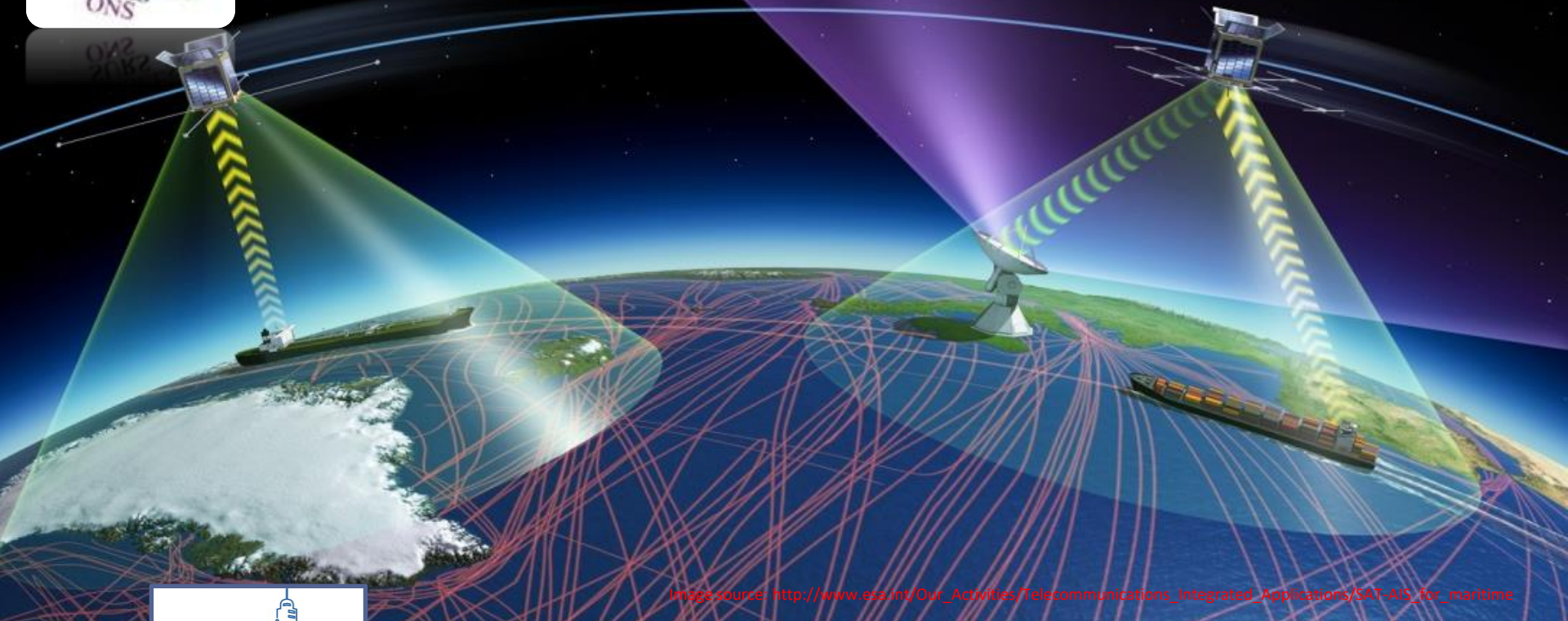
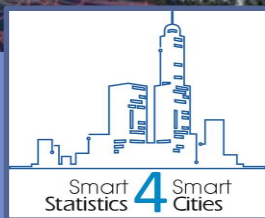


Image source: http://www.esa.int/Our_Activities/Telecommunications_Integrated_Applications/SAT_AIS_for_maritime



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What is AIS



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Automatic Identification System (AIS)

The AIS is an international ship identification standard that allows vessels to transmit and receive information in the immediate vicinity.

AIS data comprised of 3 information categories:

Static: information on ship characteristics
(MMSI, IMO number, call sign, ship name, type, dimensions)

Dynamic: information on ship movements
[Ship's position (long, lat), speed over ground (SOG), course over ground (COG), navigation status]

Voyage related: information on current voyage
(destination, estimated time of arrival, draught)

Time does not exist in AIS frames. It is added by receivers



MMSI - Ship's unique identification system



GPS data to record and track position

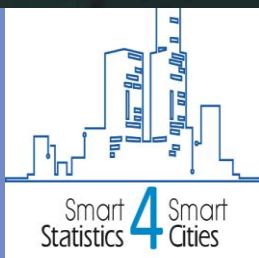


VHF radio signals for receiving and sending AIS information

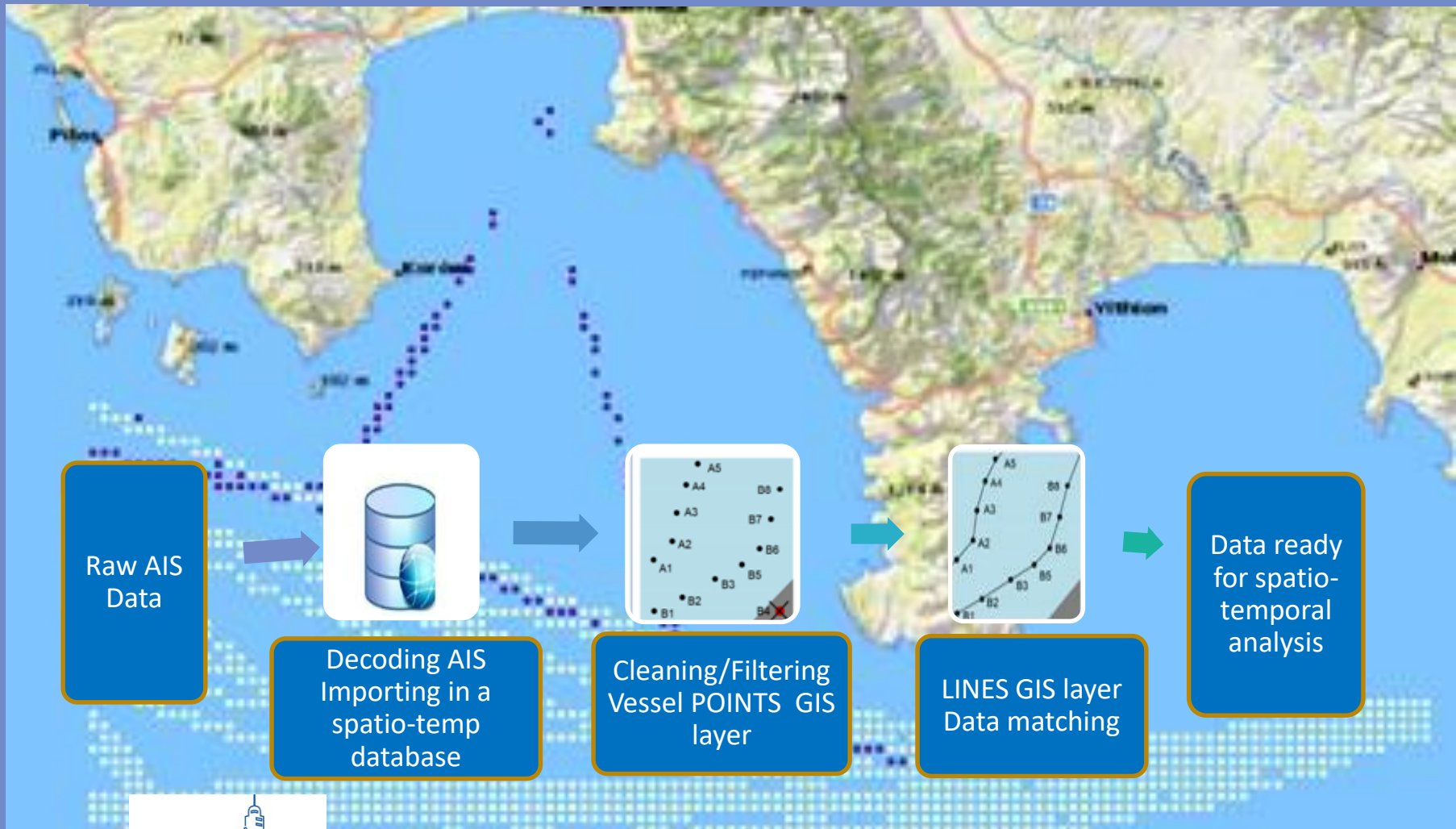
Define ship's journey



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Define ship's journey



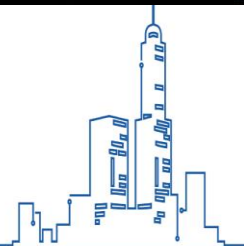
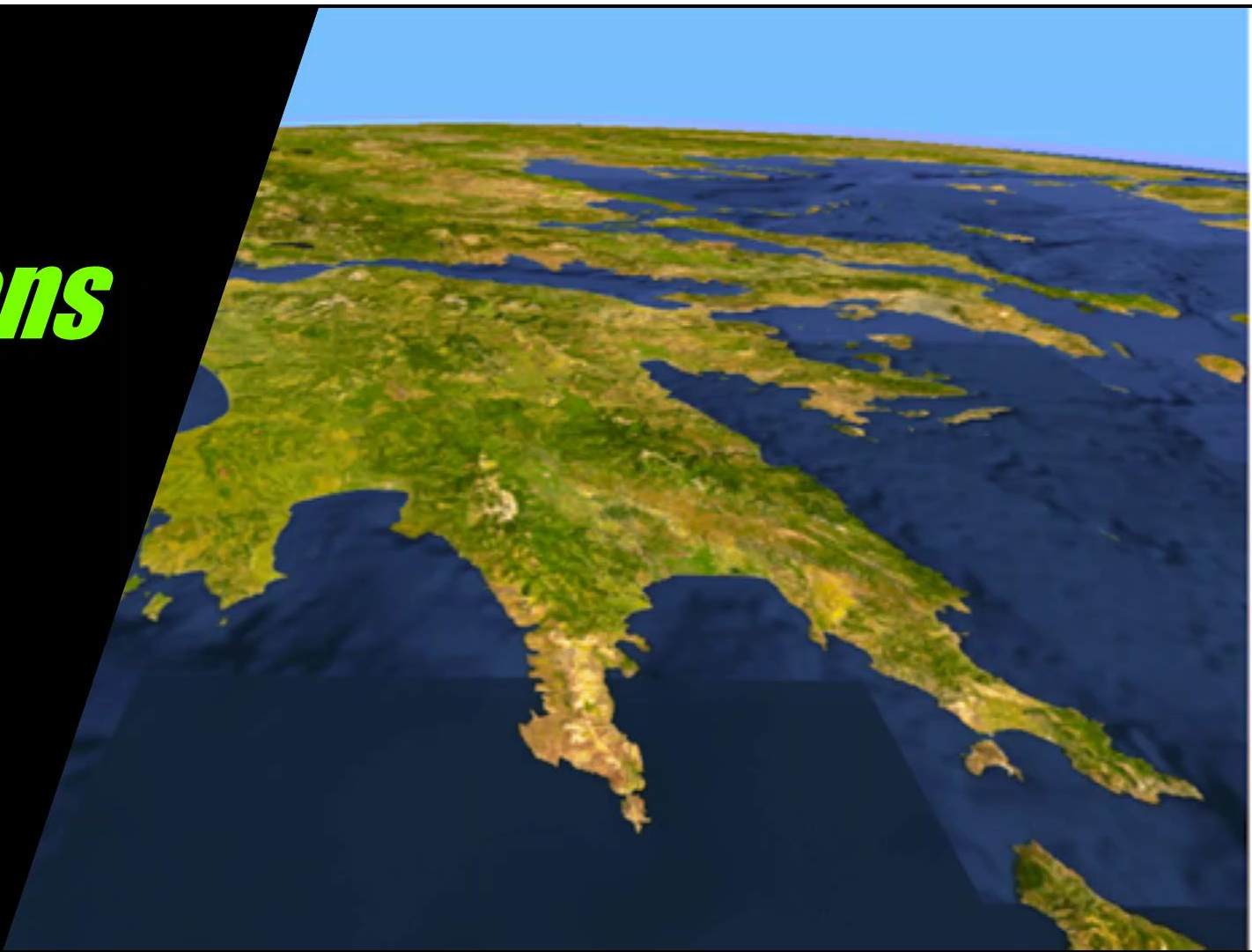
Visualization



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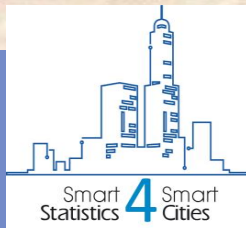
AIS positions



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Visualization (2/3)



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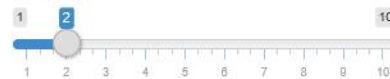
Visualization (3/3)



select date

2016-04-12

threshold:



Benefits - Challenges from the use of AIS data

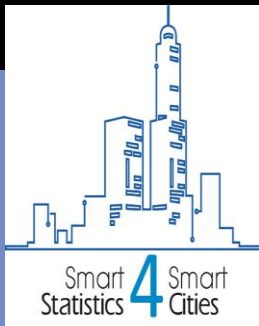
Benefits

- improve statistics (e.g., vessel movement statistics between European countries, such as port visits, and route trajectories)
- enhance timeliness and accessibility
- reduce the response burden of ports authorities and agencies
- determine the impact of maritime legislation at national and European level

Challenges

- technical challenges
- building of capacities to handle AIS data by NSIs

AI meets IoT



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AIS meets IoT (1/2)

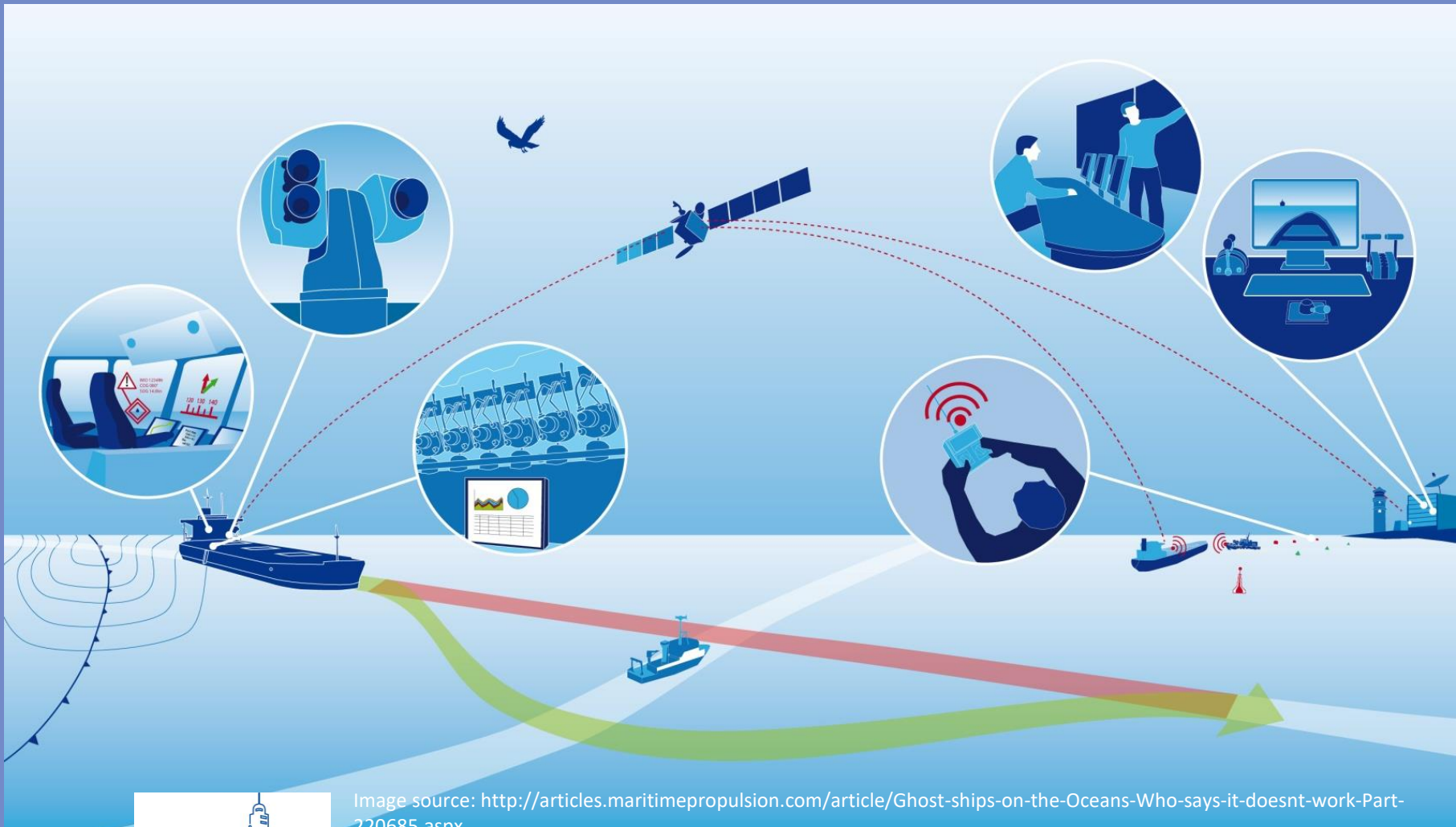
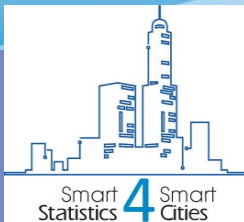


Image source: <http://articles.maritimepropulsion.com/article/Ghost-ships-on-the-Oceans-Who-says-it-doesnt-work-Part-220685.aspx>

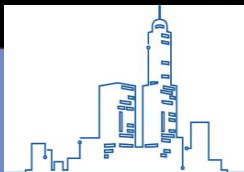
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AIS meets IoT (2/2)



Image source: http://www.marinemec.com/news/view,iot-at-sea-will-revolutionise-global-supply-chains_49068.htm

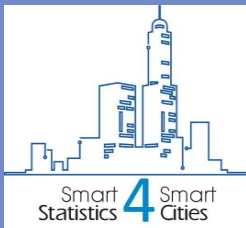


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Next Steps

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Next Steps

New ESSnet project starts end 2018

Research topics:

- Combining AIS with other data to provide more detailed information (e.g. on the type and capacity of ships)
- Anomalies in the movements of ships
- Reference frame of ports
- Further improve of port to port distance matrix
- AIS as a fast economic indicator



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Tracking ships using AIS data – An example in area of Kalamata

More information:

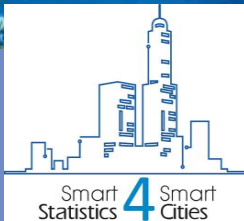
- Wiki: <https://webgate.ec.europa.eu/fpfis/mwikis/essnetbigdata/index.php/WP4>
- Github: <https://github.com/mputs/WP4/locations>

Thank you!

Questions?

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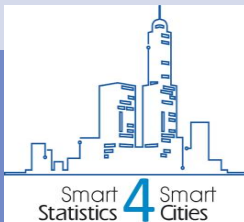
Eleni Bisioti, ELSTAT Greece, e.bisioti@statistics.gr



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2	Powell St. (2017) <i>AIS Meets IoT . How Technology is set to Transform Global Ocean Trade and Supply Chain Efficiency</i> , The Maritime Executive	https://www.maritime-executive.com/editorials/ais-meets-iot#gs.FIZPvzs
3	Le Tixerant M., Le Guyader D., Gourmelon F., Queffelec B (2018) <i>How can Automatic Identification System (AIS) data be used for maritime spatial planning?</i>	https://arxiv.org/4sfcd/
4	Marine Management Organisation (2014) <i>Mapping UK shipping density and routes from AIS</i> .	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/317770/1066.pdf
5	T. de Wit, A. Consten, M. Puts, Ch. Pierrakou, M. Bis, A. Bilska, O. Grøndal, Ø. Langsrud (2017). <i>Deliverable 4.2: Deriving port visits and linking data from Maritime statistics with AIS-data</i> .	https://webgate.ec.europa.eu/fpfis/mwikis/essnetbigdata/imag/8/8d/WP4_Deliverable_4.2_2017_02_10.pdf
6	M. Puts, O. Grøndal, M. Pouwels, A. Consten, Ch. Pierrakou, O. Langsrud (2016) <i>Deliverable 4.1: Creating a database with AIS data for official statistics: possibilities and pitfalls</i>	https://webgate.ec.europa.eu/fpfis/mwikis/essnetbigdata/imag/1/18/WP4_Deliverable_4.1_2016_07_28.pdf
7	A. Consten, M. Puts, T. de Wit, E. Bisioti, Ch. Pierrakou, A. Bilska, M. Bis, Ø. Langsrud (2018). <i>Deliverable 4.8: Consolidated report on project results including a cost-benefit analysis of using AIS-data for official statistics</i> .	https://webgate.ec.europa.eu/fpfis/mwikis/essnetbigdata/imag/3/3f/WP4_Deliverable_4.8_31_05_2018_final.pdf
8	A. Consten, M. Puts, T. de Wit, E. Bisioti, Ch. Pierrakou, A. Bilska, M. Bis, O. Grøndal, Ø. Langsrud (2017). <i>Deliverable 4.3: Report about sea traffic analyses using AIS-data</i>	https://webgate.ec.europa.eu/fpfis/mwikis/essnetbigdata/imag/5/5c/WP4_Deliverable_4.3_2017_07_21_v1.0.pdf
9	BigOceanData (2016) <i>AIS and the Internet of Things</i>	http://www.bigoceandata.com/news/ais-and-the-internet-of-things/



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