

AIS SHIPPING DATA AS DRIVER OF INTELLIGENCE FOR PORT & LOGISTICS COMMUNITIES

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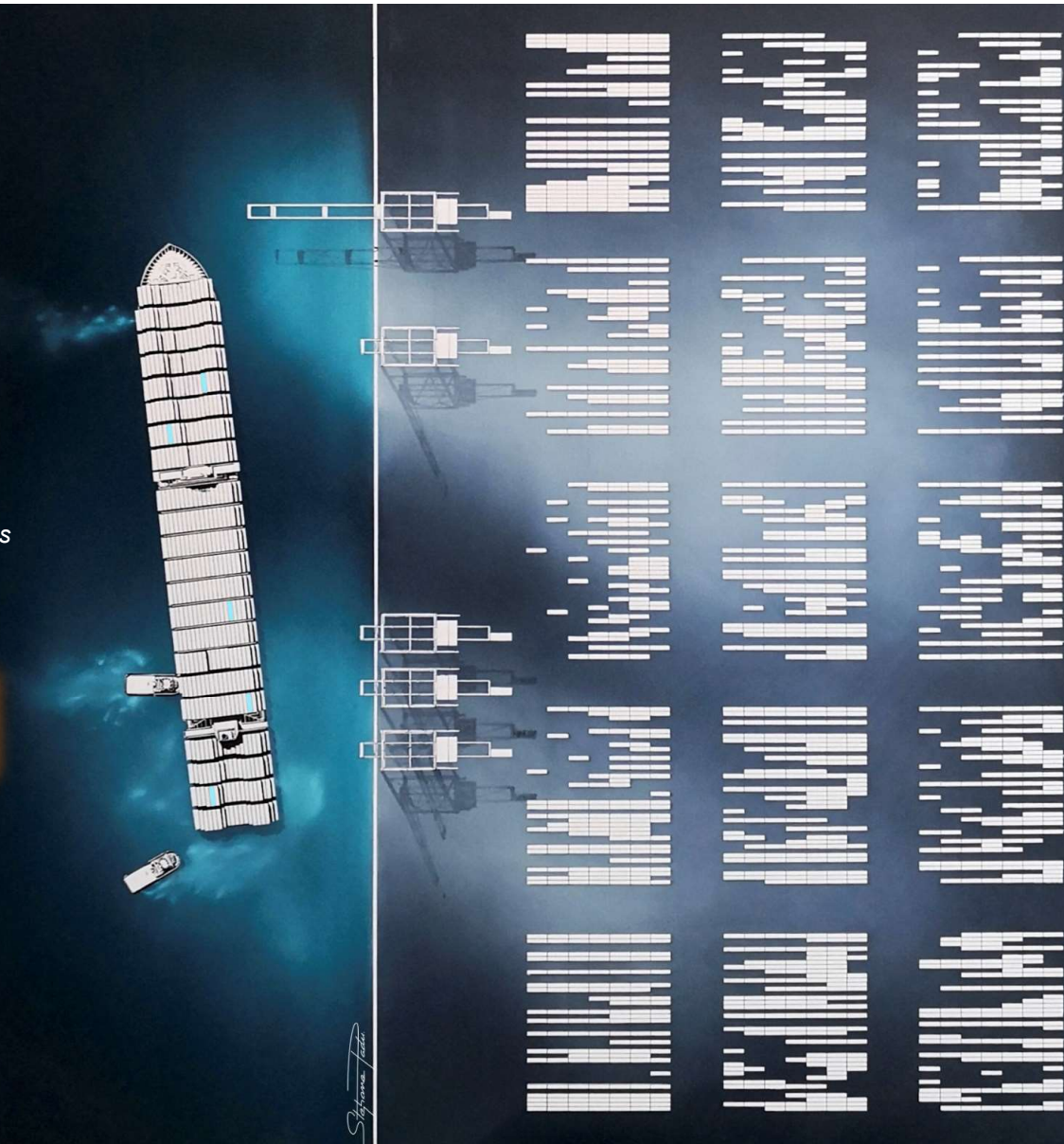
CNAM – Université du Havre



Arnaud SERRY

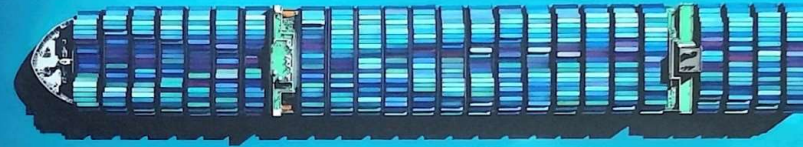
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Sébastien Fournier

Why AIS is not enough to turn data into intelligence ?

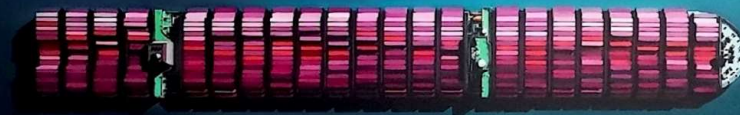


❖ **A tool to analyse shipping line strategies**

❖ **A tool to support governmental agencies & port authorities**

❖ **A tool to anticipate logistics & value chain adjustment**

❖ **A tool to include entire communities**



Discussion & Conclusion

AIS is an on-board vessel location system to provide information to surrounding vessels and shore stations

AIS was made mandatory via Annex VI of the IMO - SOLAS Convention in 2004



Ship identification

- Name of the vessel
- Type of vessel
- Length & width
- N° of MMSI & IMO

Status information

- Position of the ship (Date & Hour)
 - Speed
- « Status » of navigation
 - Route

Voyage information

- Type of cargo
- Hazardous materials
- Port of Departure
- Port of Destination

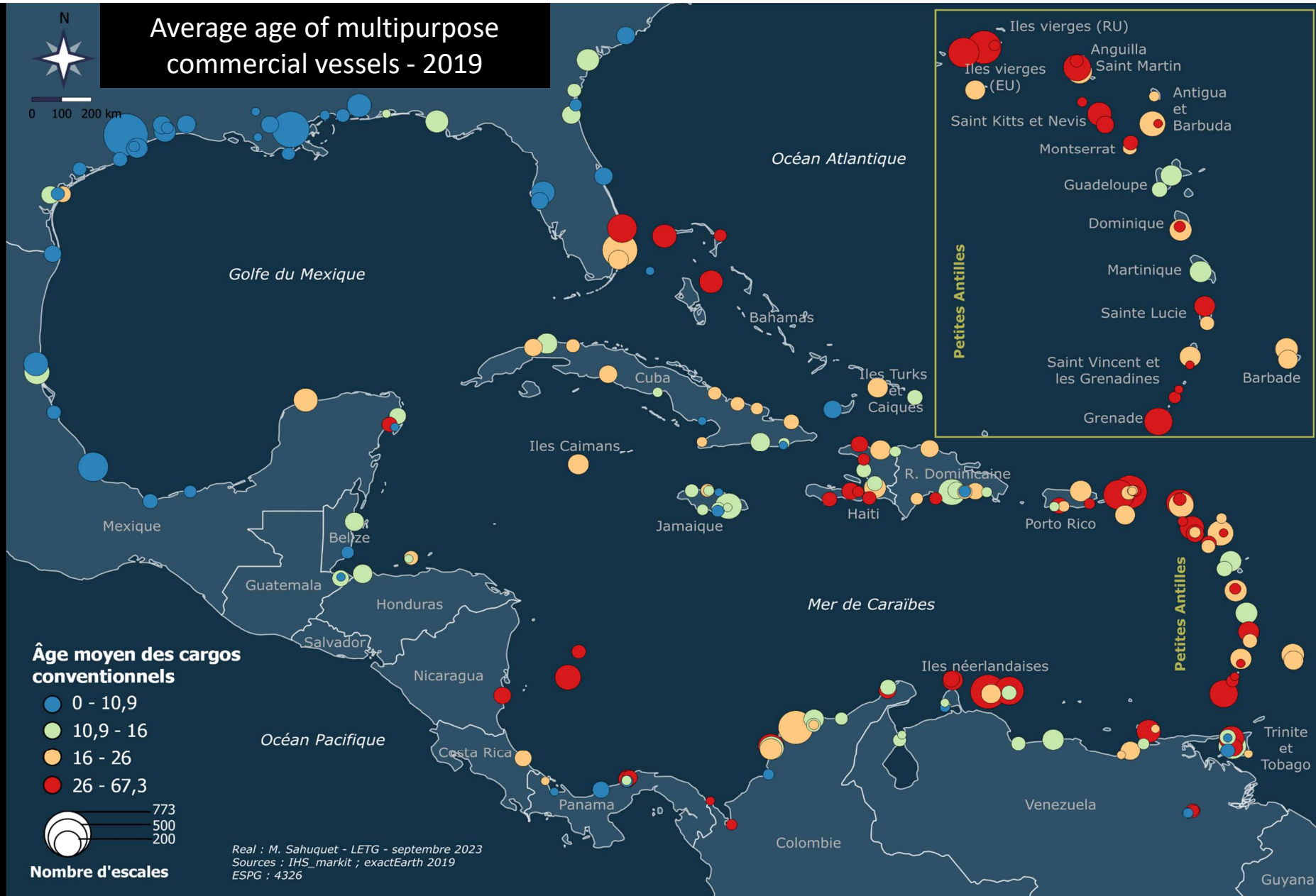
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Some interesting snapshot which can be turned out into smart & colored maps

Going beyond one simple automatic signal for maritime navigation safety & security matters

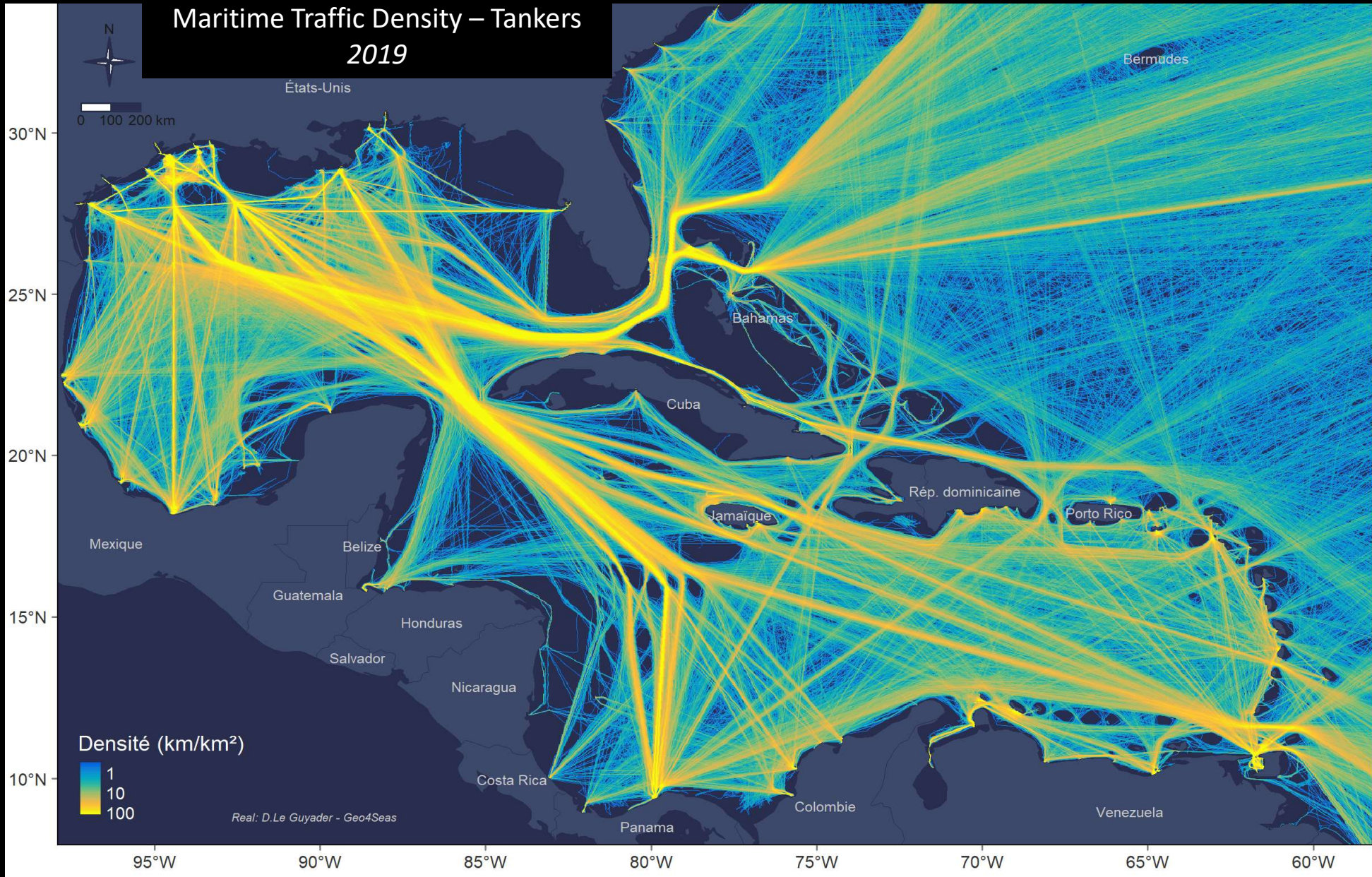


Average age of multipurpose commercial vessels - 2019



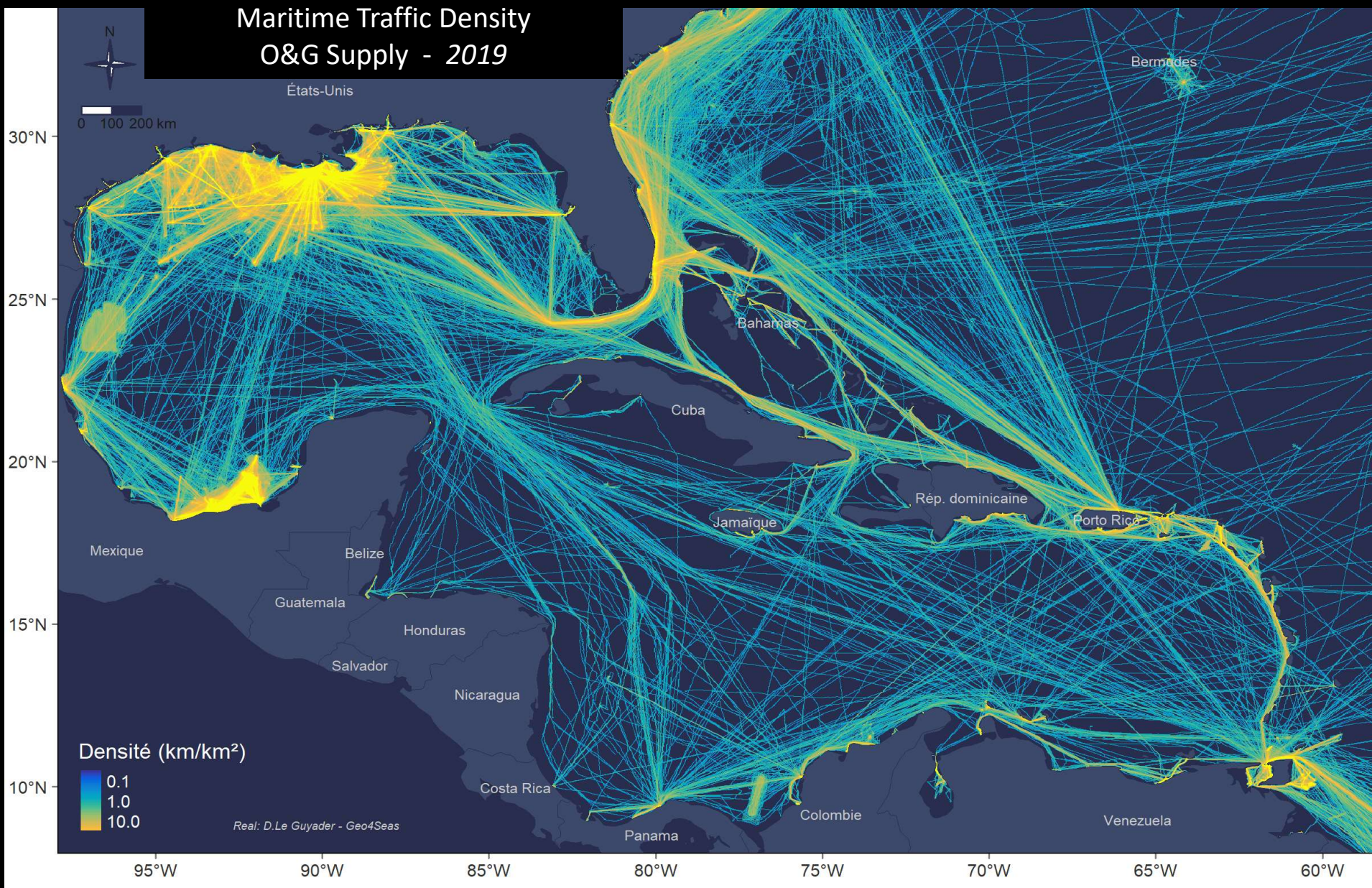
Real : M. Sahuquet - LETG - septembre 2023
 Sources : IHS_markit ; exactEarth 2019
 ESPG : 4326

Maritime Traffic Density – Tankers 2019



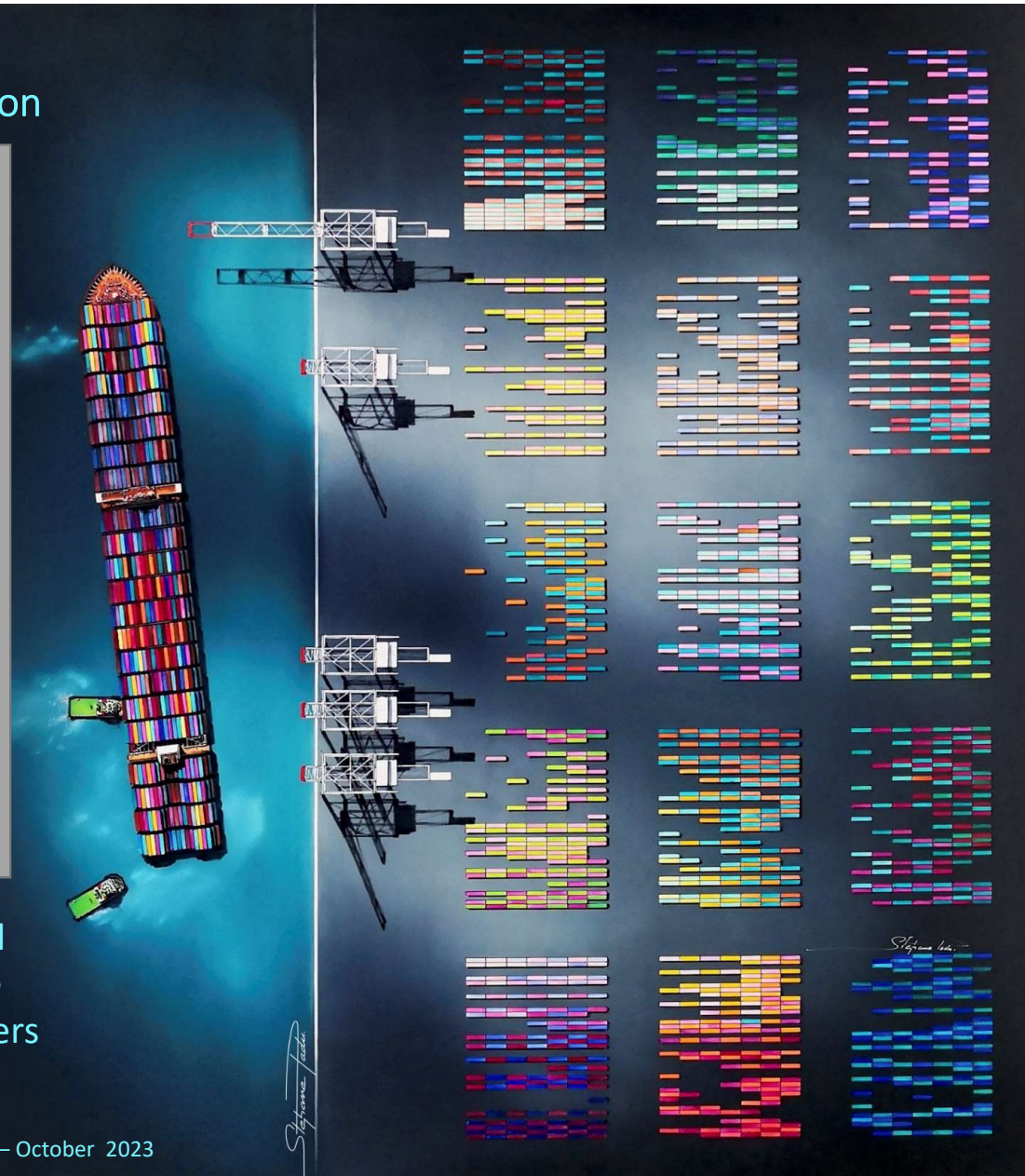
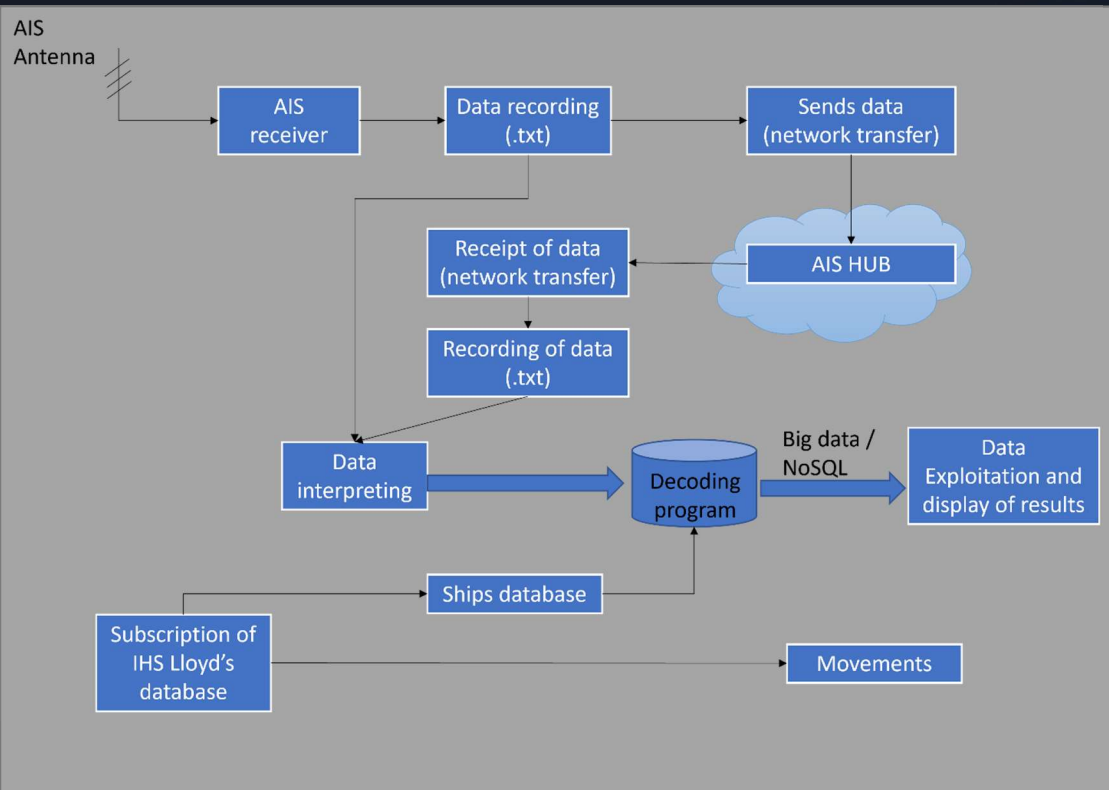
<https://portail.indigeo.fr/geocms/projects/caraibes-traffic-ais-2019>

Maritime Traffic Density O&G Supply - 2019



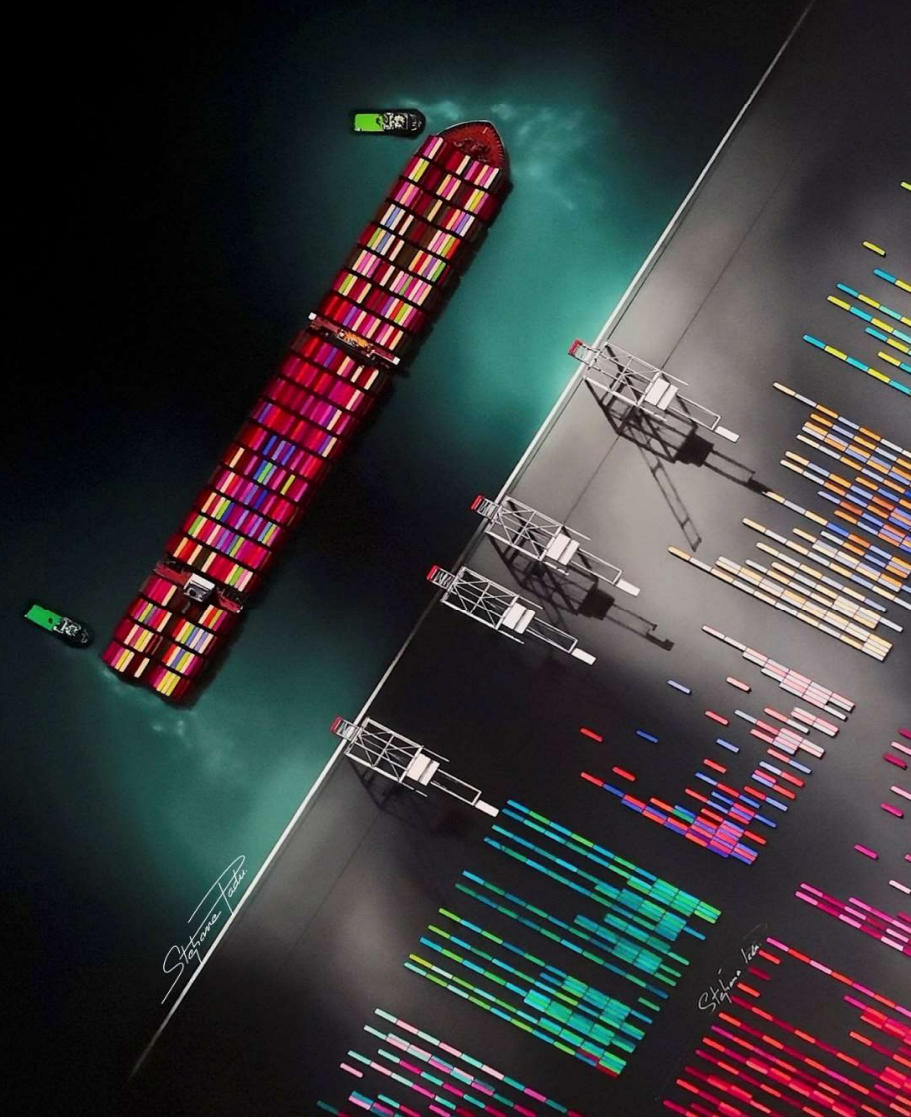
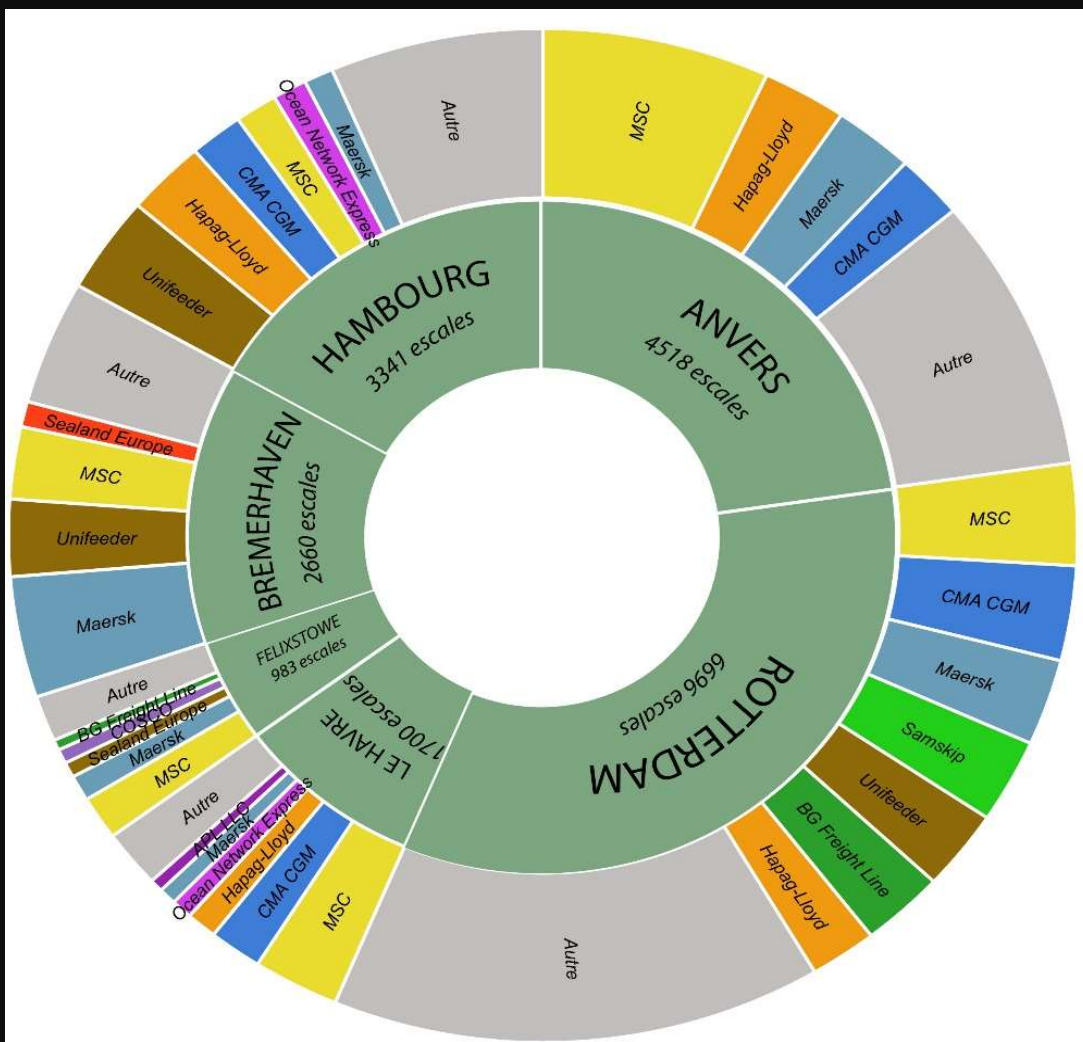
<https://portail.indigeo.fr/geocms/projects/caraibes-traffic-ais-2019>

CIRculation* MARitime (CIRMAR) : Matching Shipping & Port Layers of information



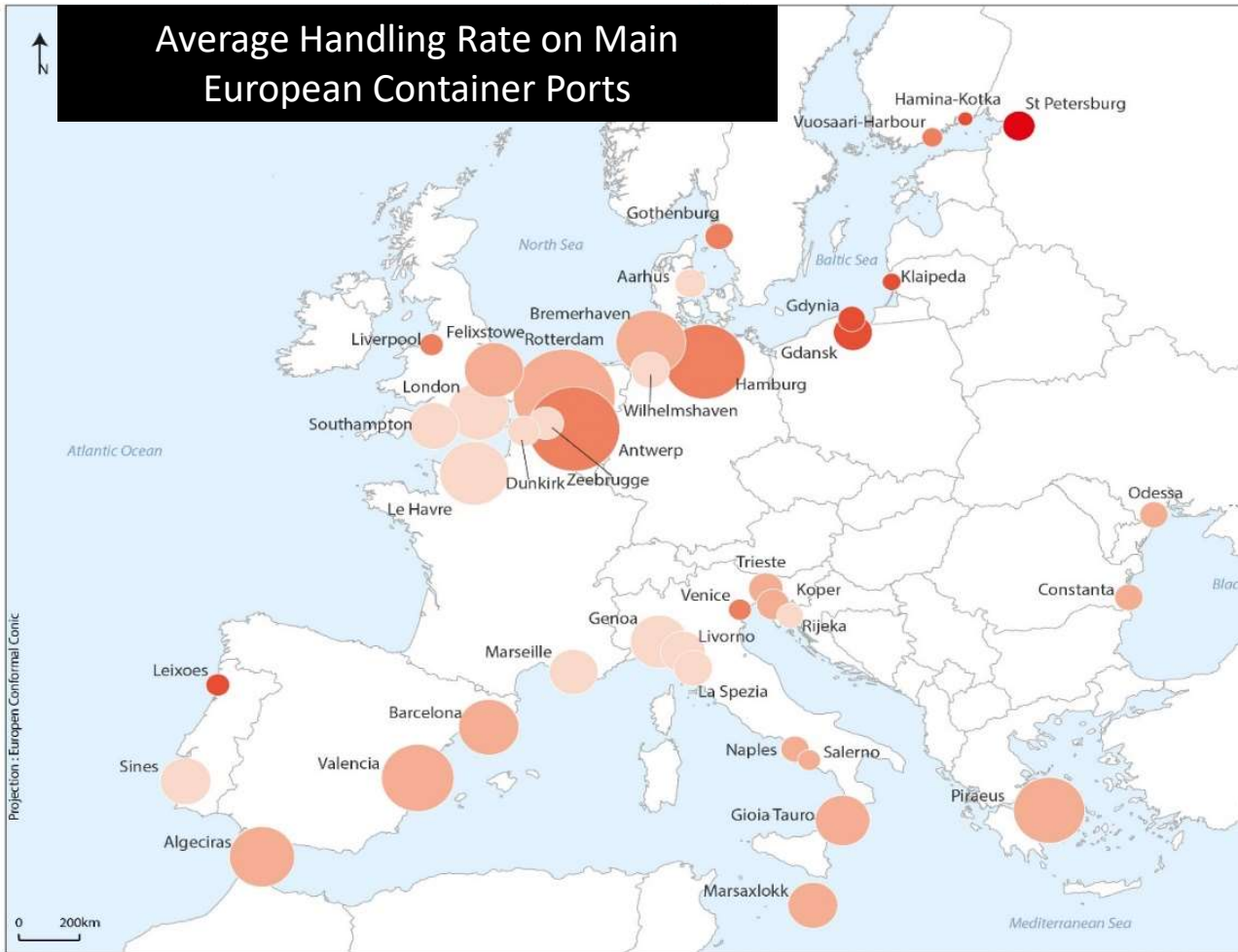
→ First hand data to power some tailor made analysis for G'Tal Agencies, Ministries, Port Authorities as well as various private stakeholders as SL, Terminal Op', 3PL, Freight Fowarders & Shippers

Port of call Management flexibility & Strategic volatility of liner shipping companies

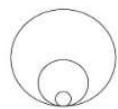


- ❖ Evolution of port competition overview
- ❖ Port status (Hub – Gateway – Feeder & SSS)
- ❖ Blank sailing exposure

Average Handling Rate on Main European Container Ports



Total capacity of containerships calling in 2020 (TEUs millions)



29.19 (Rotterdam)
5.07 (Marseille)
0.8 (Hamina Kotka)

Average 2020 handling rate (%)



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Date source : Website of ports authorities, National statistics institutes

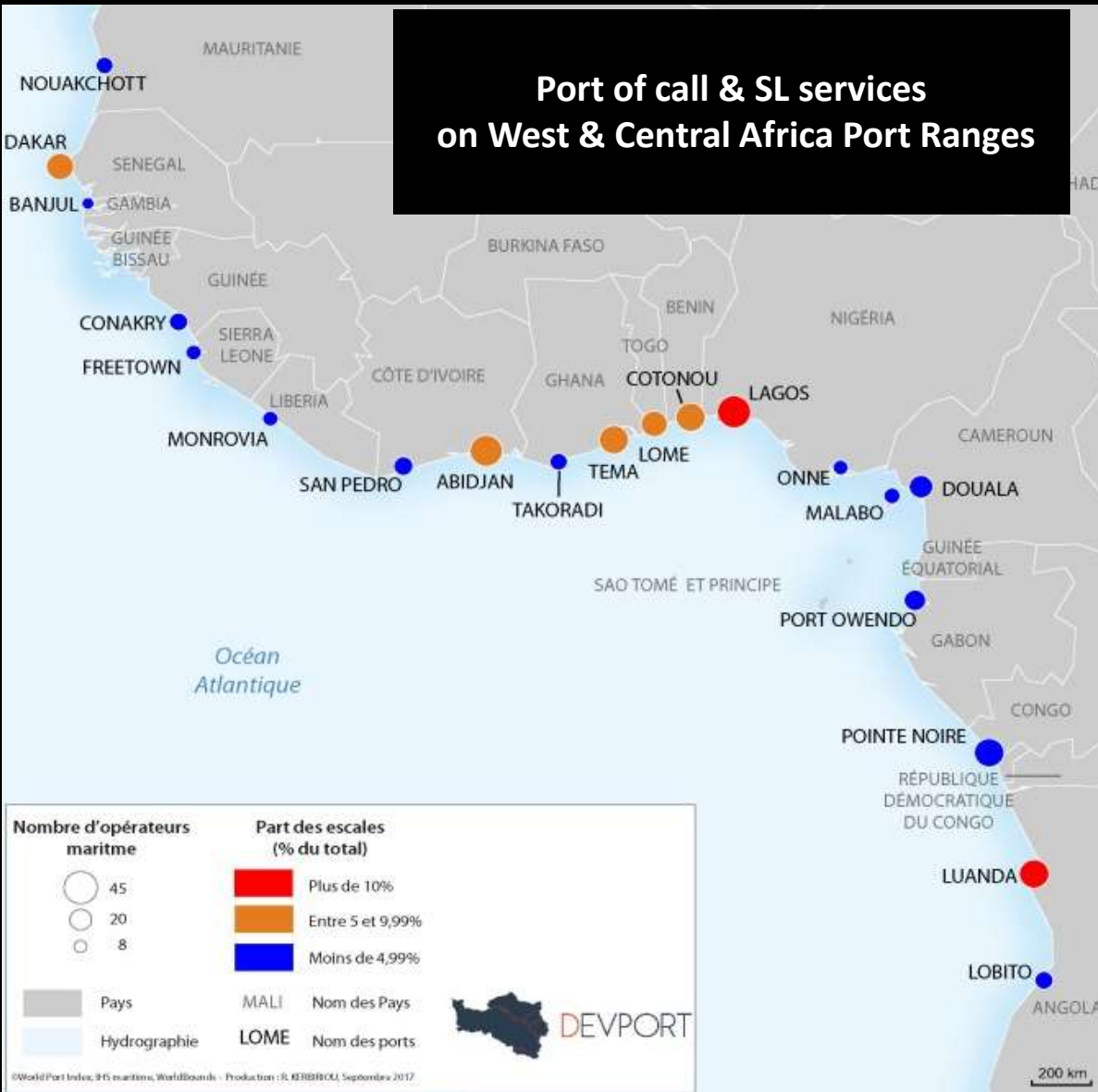
Target : Ports, TO, SL, Public bodies...

- ✓ All liner shipping lines calls for around 50 European ports (AIS DATABASE)
- +
- ✓ Calculation of Total TEUs capacity for each call on each port (IHS Lloyd's DATABASE)
- +
- ✓ Matching & combining with port stats (PORT & TERMINAL DATA)



Degree of congestion, Capital intensity, Assets efficiency, Competitive benchmarking, Public/Private Investment accuracy, etc. !





Scale & Target : Port Range & Port Authority

✓ Matching port of call & Liner services



✓ Multi-year analysis to calculate distribution and concentration trends



**A decision-making instrument
and investment monitor
for the public sector**

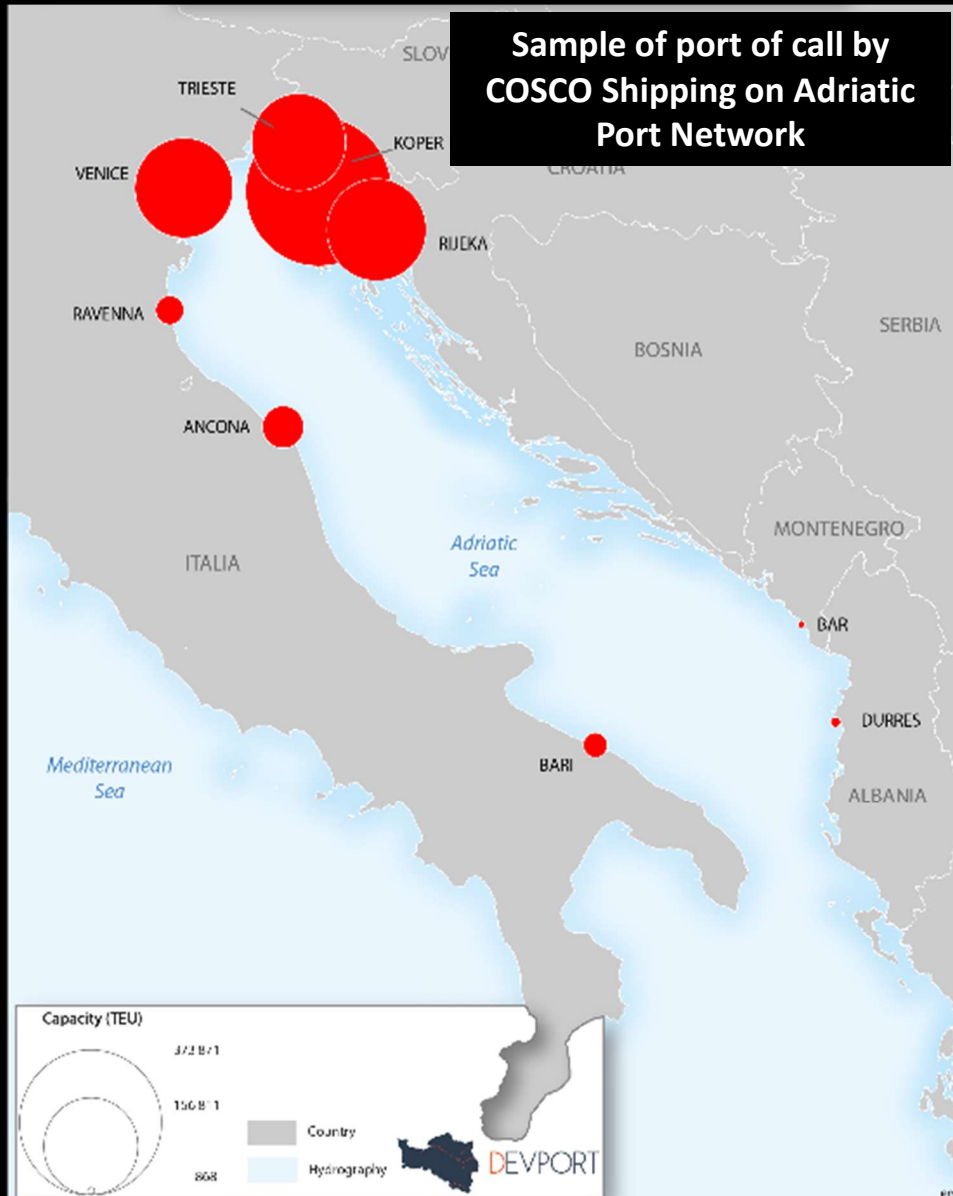
Business intelligence for Terminal operators

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Zoom on one single Shipping Line Operator

- ✓ Port of call organization by Cosco Shipping



- ✓ Containerships on call considering total theoretical capacity deployed

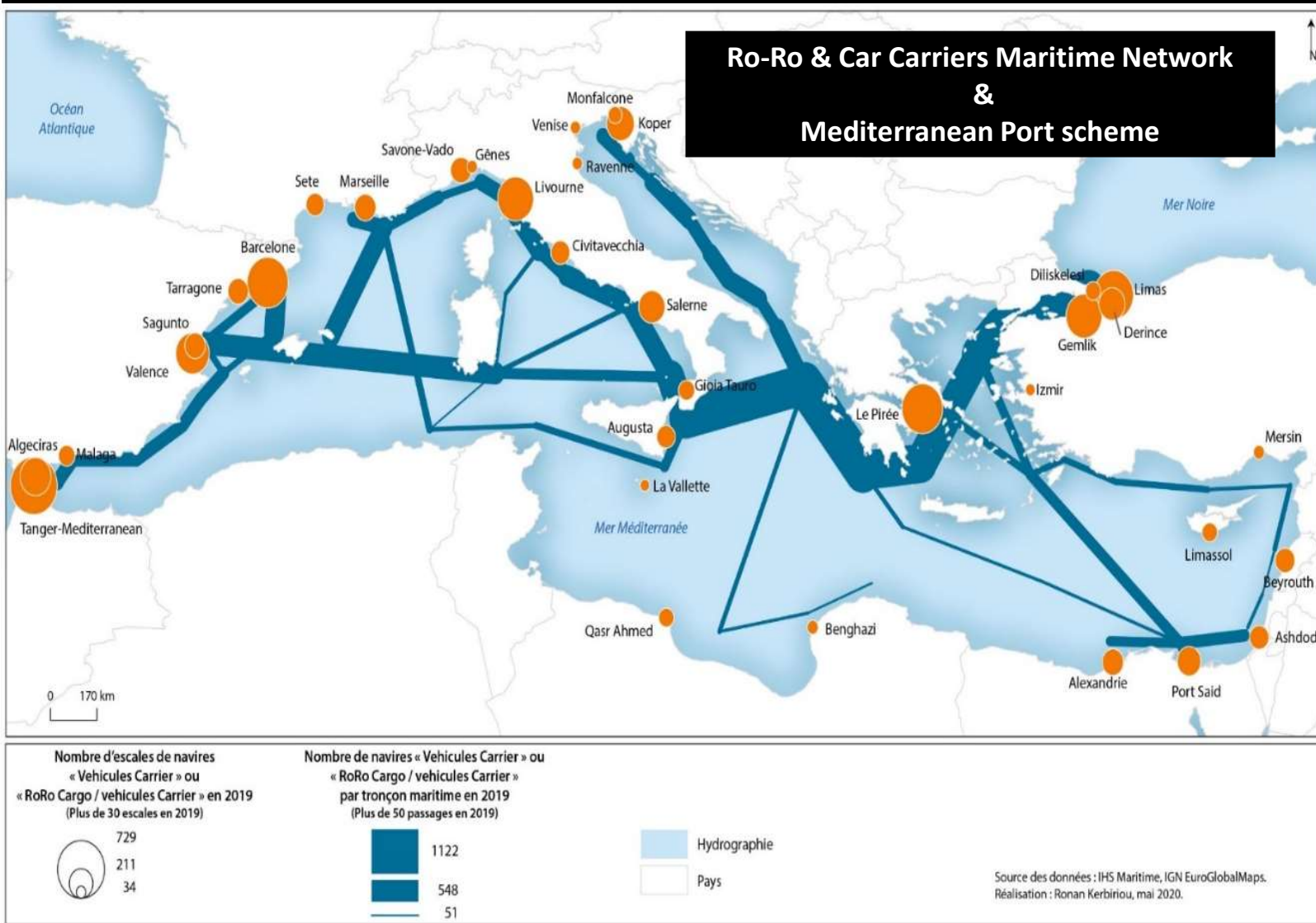


- ✓ Multi-year analysis to calculate distribution and concentration trends



Understanding the evolution of a regional system/network by assessing the potential for competition and synergies between terminals / port authorities





- ✓ Tracking of all Ro-Ro vessels & ports of call
- +
- ✓ Spatial distribution by RO-RO theoretical capacity
- +
- ✓ Matrice Origine/Destination Matric between each port of call for each ship for each service

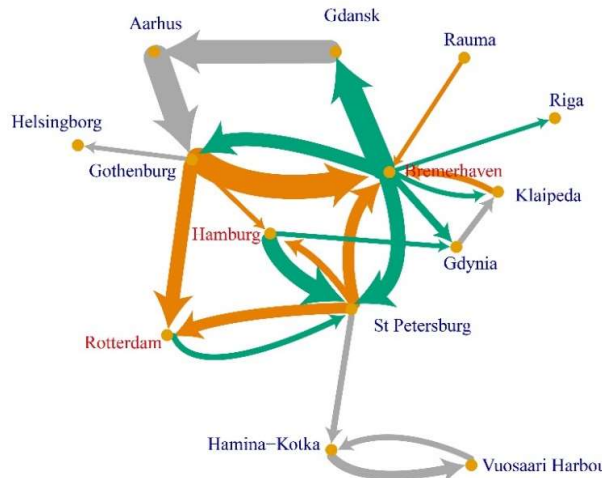


Analysis of a regional maritime network and the evolution of inter-port relationships



Container Shipping Connectivity and “Intensity” in the Northern European port network

2012



✓ Tracking of all Containerships & ports of call



✓ Spatial distribution

by TEUs theoretical capacity



✓ Origine/Destination Matrix between each port of call for each ship for each service



Analysis of a regional maritime network and the evolution of inter-port relationships at the Northern Europe/Scandinavian/Baltic Ranges

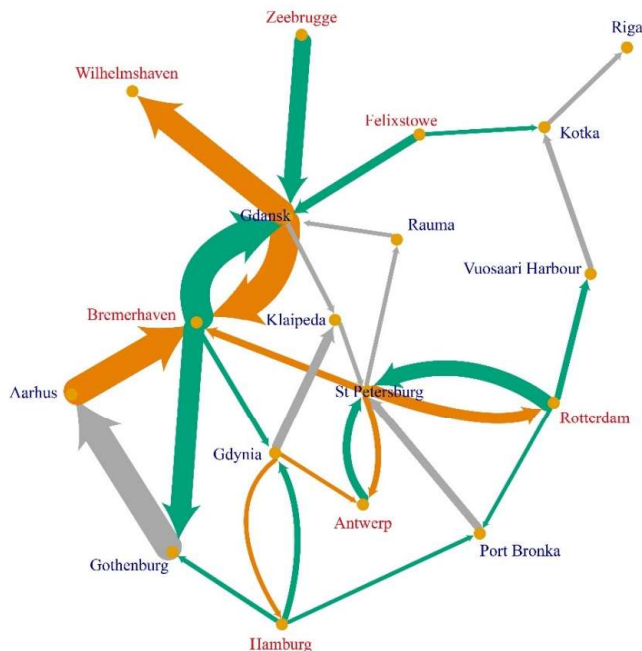
❖ “Dynamic vision” of Baltic/Scandinavian inter-port relations (competition - complementarity)

❖ Regional hub status rivalry through real capacity distribution (mother ships vs feeders/ SSS vessels)

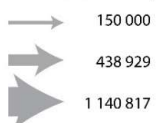
❖ The impact of geopolitical and regulatory considerations on the development of the maritime network and port relations



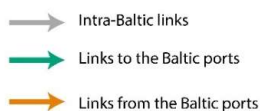
2020



Capacity of containerships links (More than 150 000TEU)



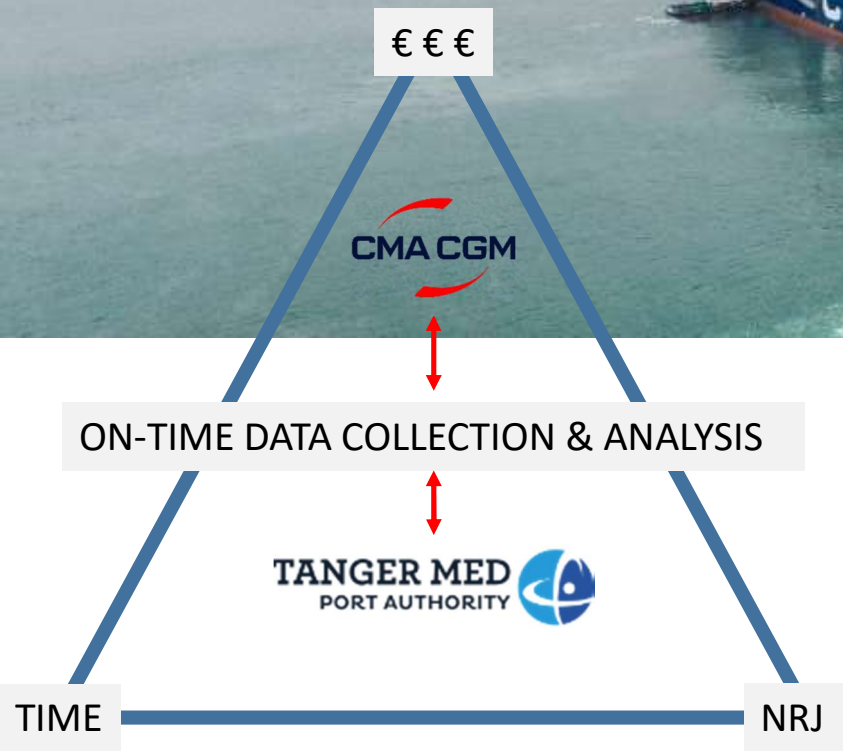
Direction of link



On-time calculation to enhance ETA & optimizing each port of call

Team-up initiative between SL & Harbor Master

The case of TANGER MED/CMA-CGM on a Caribbean – Med Leg



✓ Integration of "sea and land" data between CMA-CGM and TM Harbor Master

+

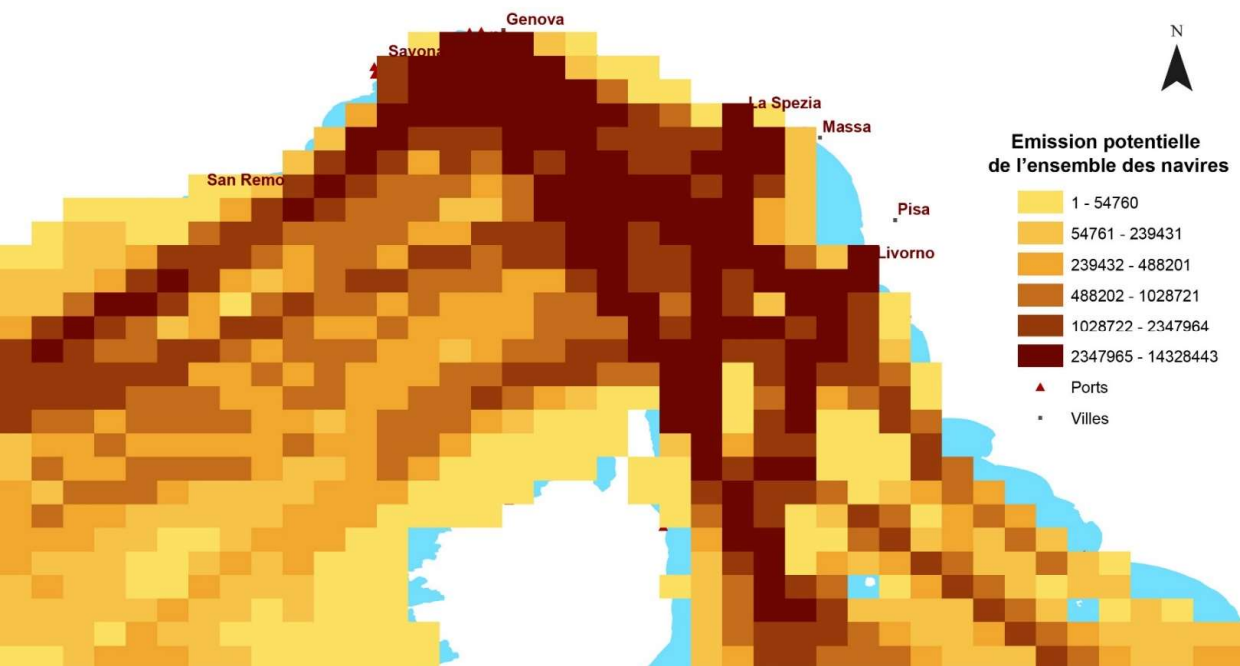
✓ Commercial vessel speed adjustment

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✓ Reducing of anchoring/waiting time

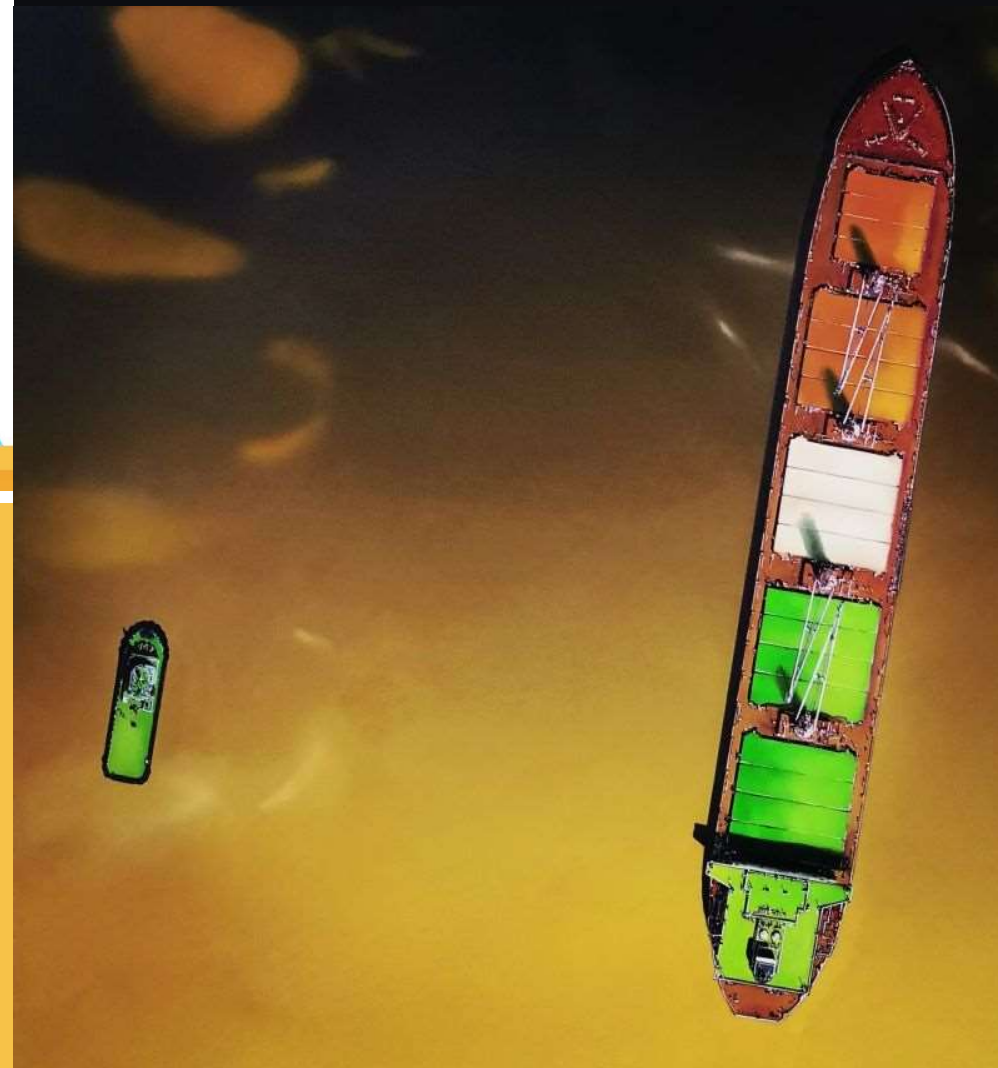
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✓ Optimizing the management of ship berthing and the entire port of call operation



Estimation of potential ship emissions (NO_x, SO_x, CO₂)

Sample : The case of the Gulf of Genoa



✓ IMO Vessel + Speed + Engine specs

(IHS Lloyd's DATABASE)



✓ Navigation status (berth/movement/anchorage)

(AIS DATABASE)



✓ Average emissions calculation

(IMO Impact Factors & DATABASE)

Discussion & Conclusion

❖ The data is everywhere...but still fragmented...

(... and not always available)

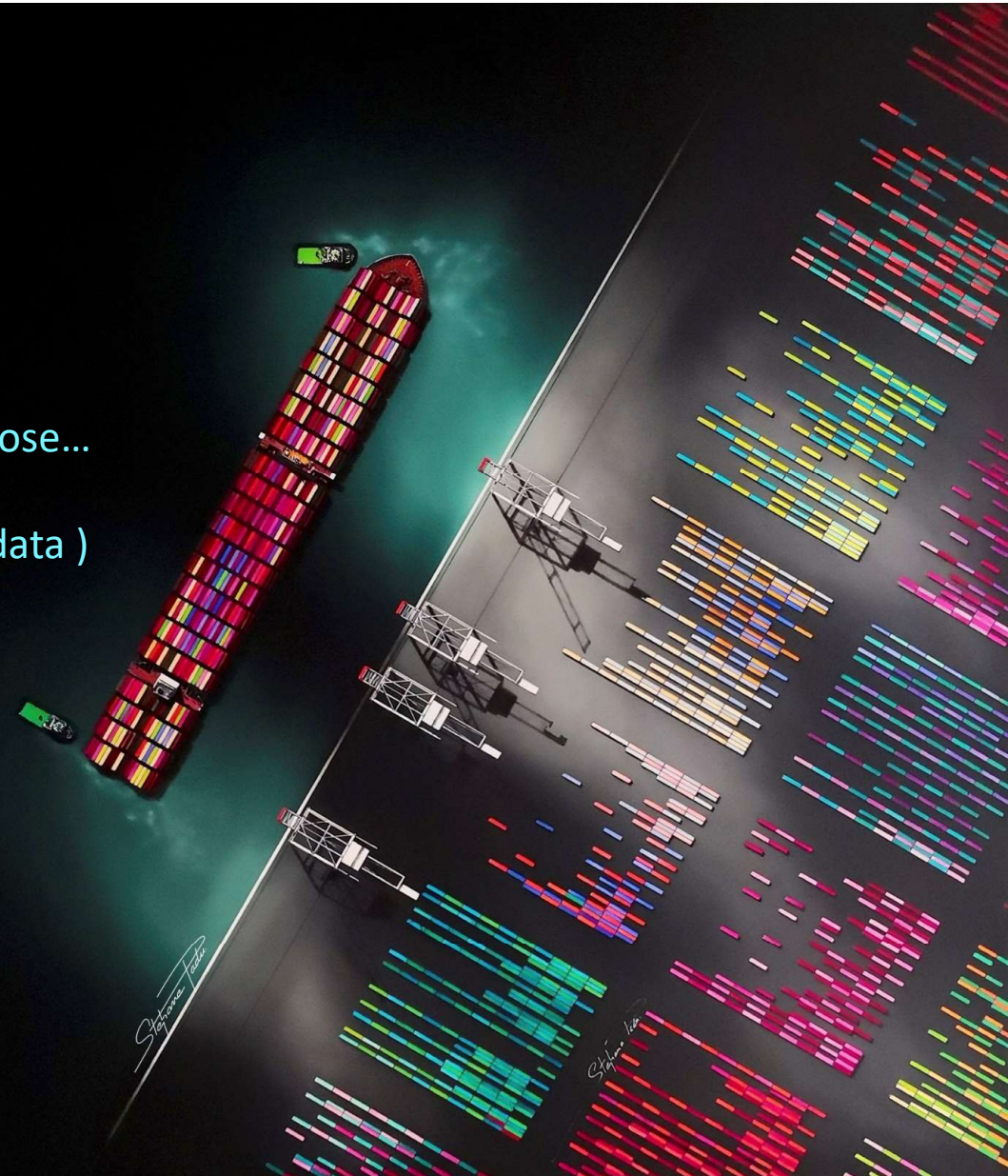
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- ... The definition of needs... by whom & for what purpose...

(... To produce & convert some collective intelligence of data)



- Strategic & Economic decision-making
 - Negotiation & lobbying
- Anticipation & Reduction of Risks
- Forecast & Predictive Analysis



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THANKS ! GRACIAS ! MERCI !

Stefano Tadui