Maritime Big Data Analytics: yes, but what for?

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The Maritime Big Data is specific

This MBD is not yet that BIG!

- Maritime Data are just recently dematerialized, paper and fax were predominant for cargo documentation, passengers list, ISPS compliance etc.
- The Data dissemination remains “point to point”, many separate data silos

The MD is not Open Source Data

- Many data are “commercially sensitive”
- A significant fraction includes Personal Data to be protected accordingly
- Information sharing is generally “conditional” except under special circumstances
- Access conditions are often related to “purpose”, which is not easy to assess
- Maritime Administrations are jealous of their prerogatives
Still, a Maritime Big Data is building

The “Dare to Share” has not yet replaced the “need to know”

• Information sharing is still “nice to get, reluctant to give”!
• The obstacles are no more technical, proper gateways are developed
• The obstacles are no more legal either, rules and restrictions are clarified

The convinced gets louder and more active

• Many “pre-operational projects” incentivized by EU
• EU DTIB actively involved in implementing interoperable MSA

The “information tide” is not yet perceived as a challenge

• The EDTIB is short of “big data” capabilities
• Incremental situation from the introduction of AIS, focus on ship data, the unknown remains unknown (how deep is the maritime crime iceberg?)
• HUMINT predominance in anti-drug war
• Total lack of culture re “meta-data” in the maritime domain
The limitation of new technologies

Relative strength of computers vs human information processing

- **Skills**
- **Rules**
- **Knowledge**
- **Expertise**

Process vs Uncertainty

Computers vs Humans
The MBD challenge

The Maritime Data is 95% declarative

- Inconsistency checks highlight errors more often than fraud
- Each User Community is generally happy with what they get
- However a large portion of the “Dark Economy” has maritime segments

The controls are costly

- Airborne presence cost around 7k€/hr
- Satellites must trade coverage against resolution
- Traffic segments using small boats remain literally invisible

The criminal patterns are rapidly evolving

- “Decentralized” and opportunistic organizations
- One day clean, one day dark, unspecialized

And the sea is wide and borderless!
The MBD promises

Enable multiple viewpoints on the data
- Time to look not only on vessels, but also on content and people on-board
- Every data can enable a user-specific angle of view
- As an example, a cargo list can reveal different things than taxable assets

Access the primary source of each data you need
- Stop trading copies of copies of the same ship position!
- Access original data and compile them your way
- Get the opportunity to access meta-data

Develop your own aggregation of data
- “Profiling” is key in the BD world
- Inspire from the BD toolbox, but it will have to be specifically developed
- If the maritime commercial world is asked to proactively contribute to data access, find incentives! (e.g. control exemptions, fast track...)
The MBD conditions

Think “Meta-data” as much as Data access

• Tag the data: source (e.g. the receiving AIS station), signal features (e.g. VHF Doppler for S-AIS), processing (e.g. as received/verified)
• Watermark the data: e.g. non-re-dissemination, restrictions of usage...

Act as a Data Service Provider, not just as data owner

• Keep the whole data content even if you don’t use it yourself
• Insure consistent data quality control
• Insure consistent data availability
• Don’t try to anticipate how other will use it

Develop trust

• Contribute pro-actively to studies and experimentations
The MBD User Services

Users are the people having to act

• Under a defined mandate
• With the assets and budgets they have
• Within a legal framework

Focus on producing “Actionable Information”

• In line with the above
• In time to act effectively
• Certain enough to be worth acting

Certainty is the biggest challenge of BD Analytics

• “Weak signal analysis” is rarely producing certain information
• Cf antiterrorism: a long list of “possibly radicalized” produced by big data analytics is hardly actionable
Structure for future MBD systems

System layers

Raw data

Service layer

AI

Need

Decision Hel

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Behavior

Scenario

HMI
Develop CONOPS first, not last!

Storytelling allow Users and Developers to understand each other

- Co-develop evolutive scenarios/behaviors challenging the current data usage
- « Thinking out-of-the-Box » requires a specific environment and skills mix
  - To overcome the conservatism of operational thinking
  - To avoid over-selling the benefits of new technologies

Experimenting is essential

- « Table-top » exercises don’t require complex technologies
- Good preparation of the “what if” options arborescence is key
- Start from actual User threats/challenges to let them express how they currently proceed, before introducing futuristic capabilities
- Find a few “operational sponsors” ready to stay alongside and continue experimenting your developments

Addressing the “unknown unknown” remains a challenge!
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Some credentials

They trust us...