GRENDEL: Green and efficient Danube fleet

Output 4.2
Guidelines for transport & logistics management

Version 1.0 (Final)
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Pro Danube
RSOE

# Council conclusions on digitalisation of transport
January 2018

- Comprehensive and **multimodal digitalisation strategy** for the transport sector

- Importance of the **GDPR** for the transport sector

- **Impact** of automation and digitalisation of transport **on society**

- Continuation of the work of **Digital Transport and Logistics Forum** (DTLF)

- Encourages railway, logistics, maritime and the inland waterway transport sectors to **share data**

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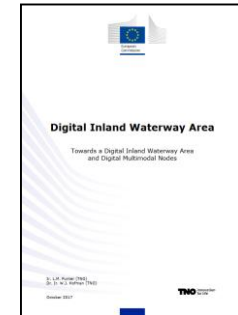GRENDEL

Digitalisation in IWT - framework
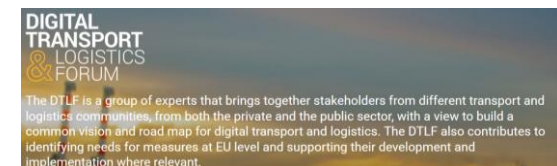
River Information Services (RIS)
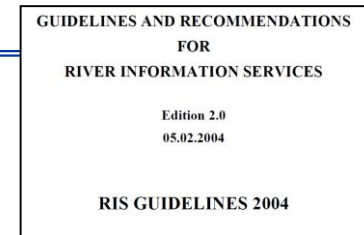
Digital Inland Navigation Area (DINA)

- Hull database
- eIWT: Electronic tool for Inland Waterways Transport → eService Record Books & eLogbooks
- European Crew Database

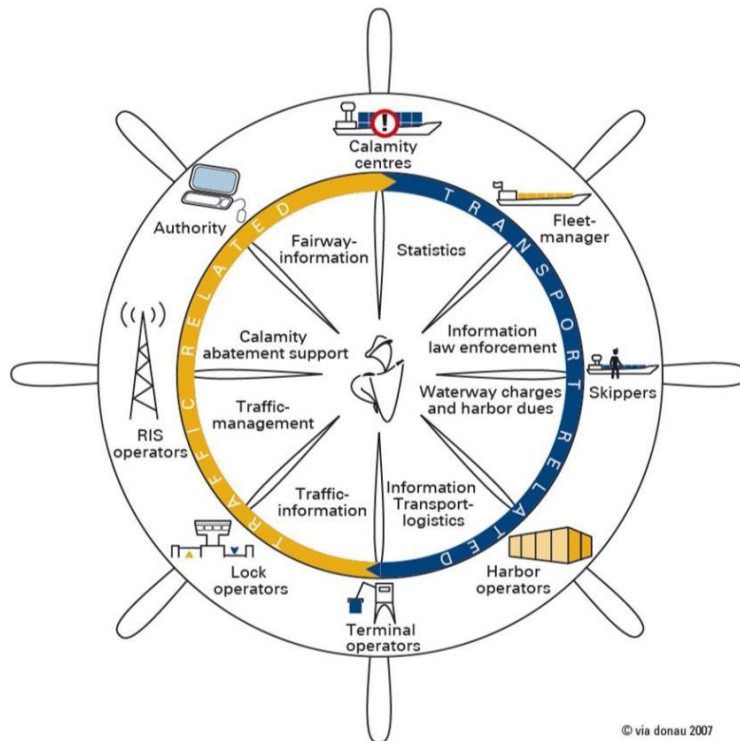**Digital Transport and Logistics Forum (DTLF)**

- eFTI – authorities are required to (a) accept electronic cargo transport information made available by operators

CEF Building blocks ...

River Information Services

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RIVER INFORMATION SERVICES RIS

Ship tracking and tracing

Electronic navigational chart

Notices to Skippers

Electronic ship reporting
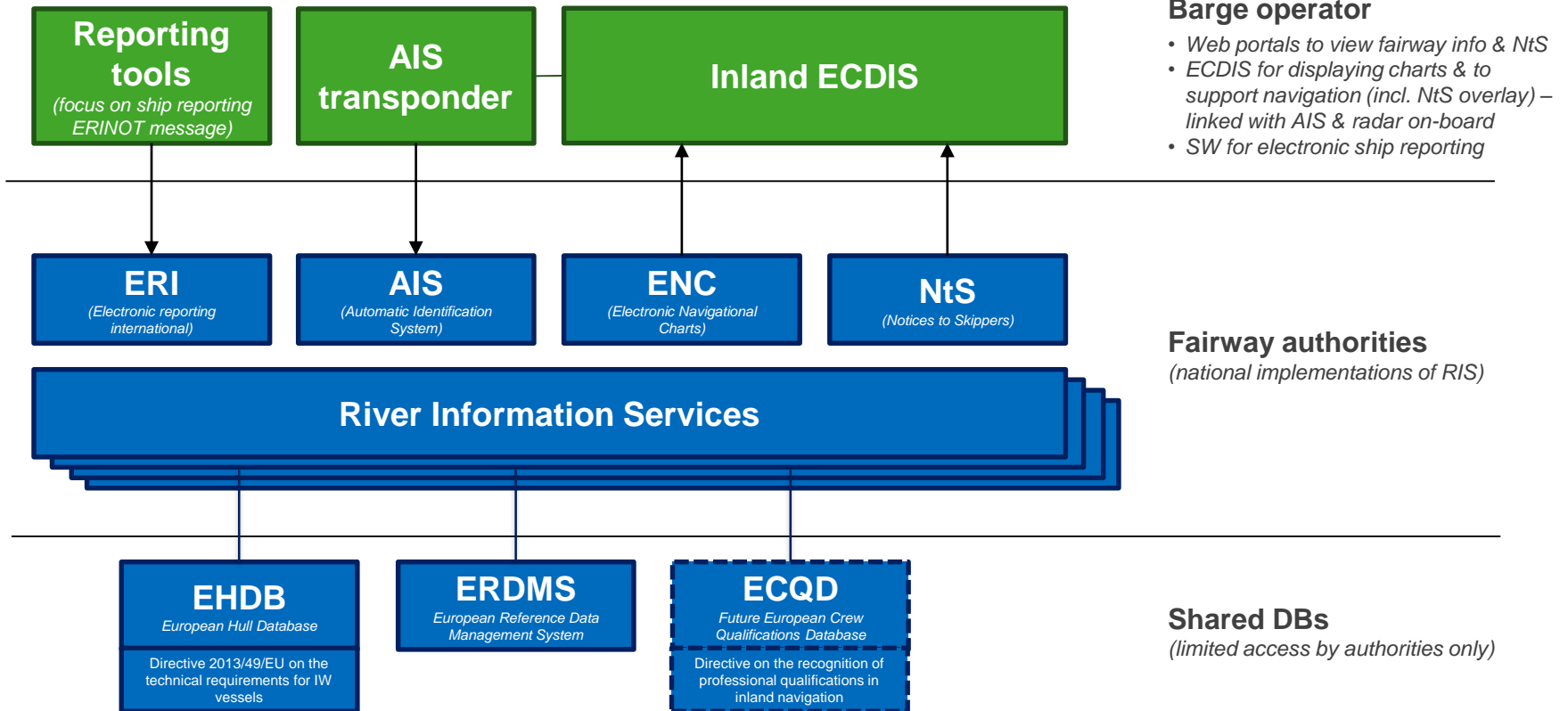
Telematics Systems and Information Services in order to increase the safety and efficiency of inland waterway transport

Current RIS System *Simplified*

Barge operator
- *Web portals to view fairway info & NtS*
- *ECDIS for displaying charts & to support navigation (incl. NtS overlay) – linked with AIS & radar on-board*
- *SW for electronic ship reporting*

Reporting tools
(focus on ship reporting ERINOT message)

AIS transponder

Inland ECDIS

ERI
(Electronic reporting international)

AIS
(Automatic Identification System)

ENC
(Electronic Navigational Charts)

NtS
(Notices to Skippers)

Fairway authorities
(national implementations of RIS)

River Information Services

EHDB
European Hull Database

Directive 2013/49/EU on the technical requirements for IW vessels

ERDMS
European Reference Data Management System

ECQD
Future European Crew Qualifications Database

Directive on the recognition of professional qualifications in inland navigation

Shared DBs
(limited access by authorities only)

© DINA (amended by INDanube / PDM)

Legal & commercial bottlenecks for sharing data

Privacy legislation

- European Hull DB (EHDB): underlying regulations prohibit data sharing with 3rd parties (only fairway authorities and other actors specified in the service agreement for EHDB

- Location: skippers & crew living on the vessel →position is not considered personal data (acc. to EU Data Protection Directive 95/46/EG), BUT it can be considered as such when linked to other identifying info about persons on-board.

- Crews & their qualifications: IWT workers' qualification directive ... *personal data may be processed only for the purposes of implementation, enforcement and evaluation of the directive and exchange of information between the authorities and producing statistics* → re-use of data for other purposes or controlled sharing with 3rd parties not foreseen.

Commercial sensitivity

- RIS directive ... *"the introduction of RIS should not lead to uncontrolled processing of economically sensitive data relating to market operators"* (e.g. to traffic patterns and individual voyages and calls in terminals. Fairway authorities can collect this data for VTT purposes, but it is not intended to share this data with 3rd parties.)

Liability

- Based on voyage plans & traffic patterns it is possible for a fairway authority to calculate ETAs or schedule lock operations → however delays may happen and potential providers of such services want to limit liability or are reluctant to share such data at all

Commercial agreements

- Customer-supplier* specific agreements require certain level of confidentiality regarding details of the cargo carried and the specific customer served

Summary based on the pre-findings consolidated in DINA
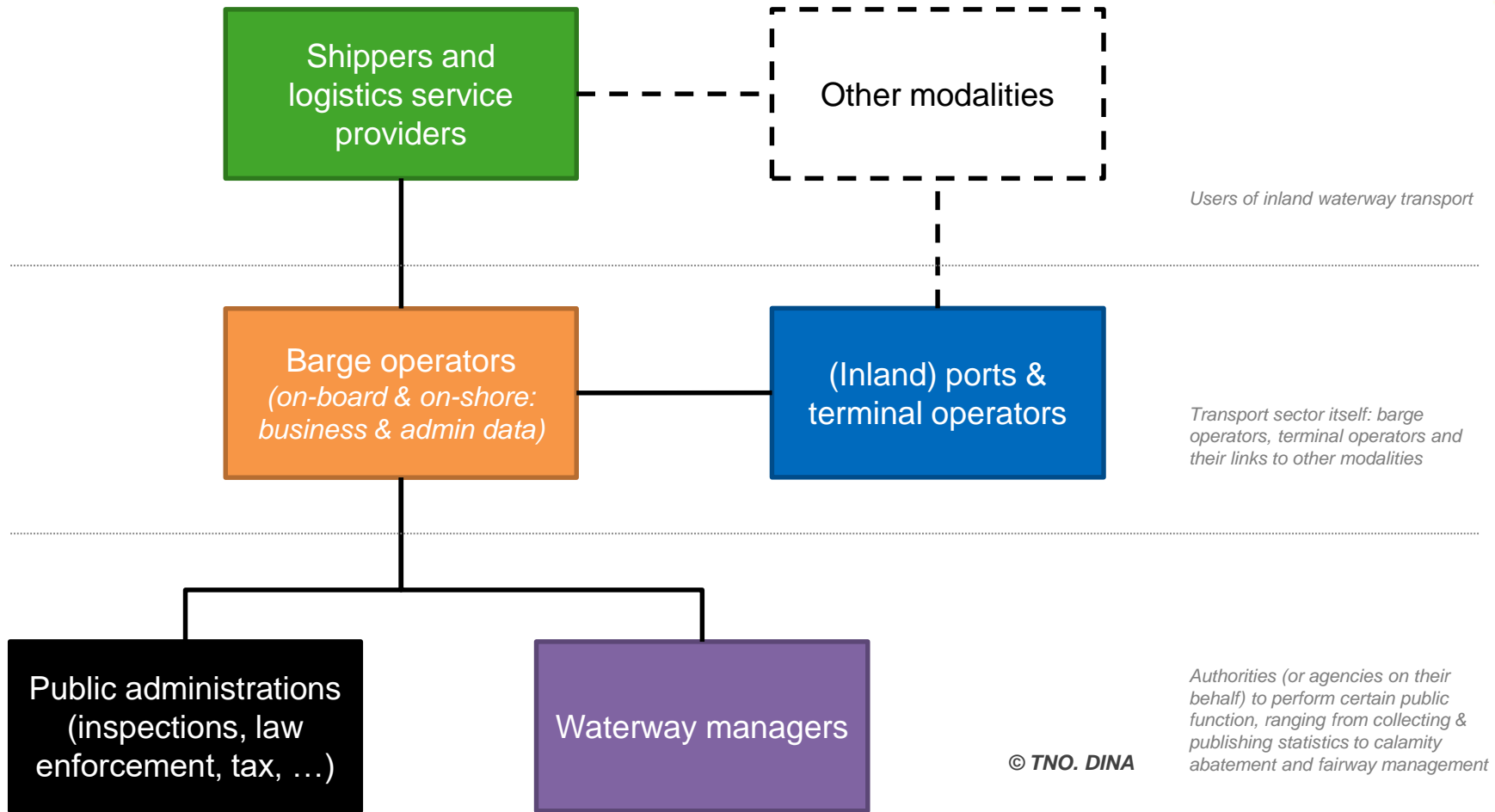
DIGITAL INLAND WATERWAY AREA

*The proposed Digital Inland Waterway Area (DINA) is a concept to **interconnect information** on **infrastructure, people, operations, fleet and cargo** in the inland waterway transport sector and to connect this information with other transport modes.*

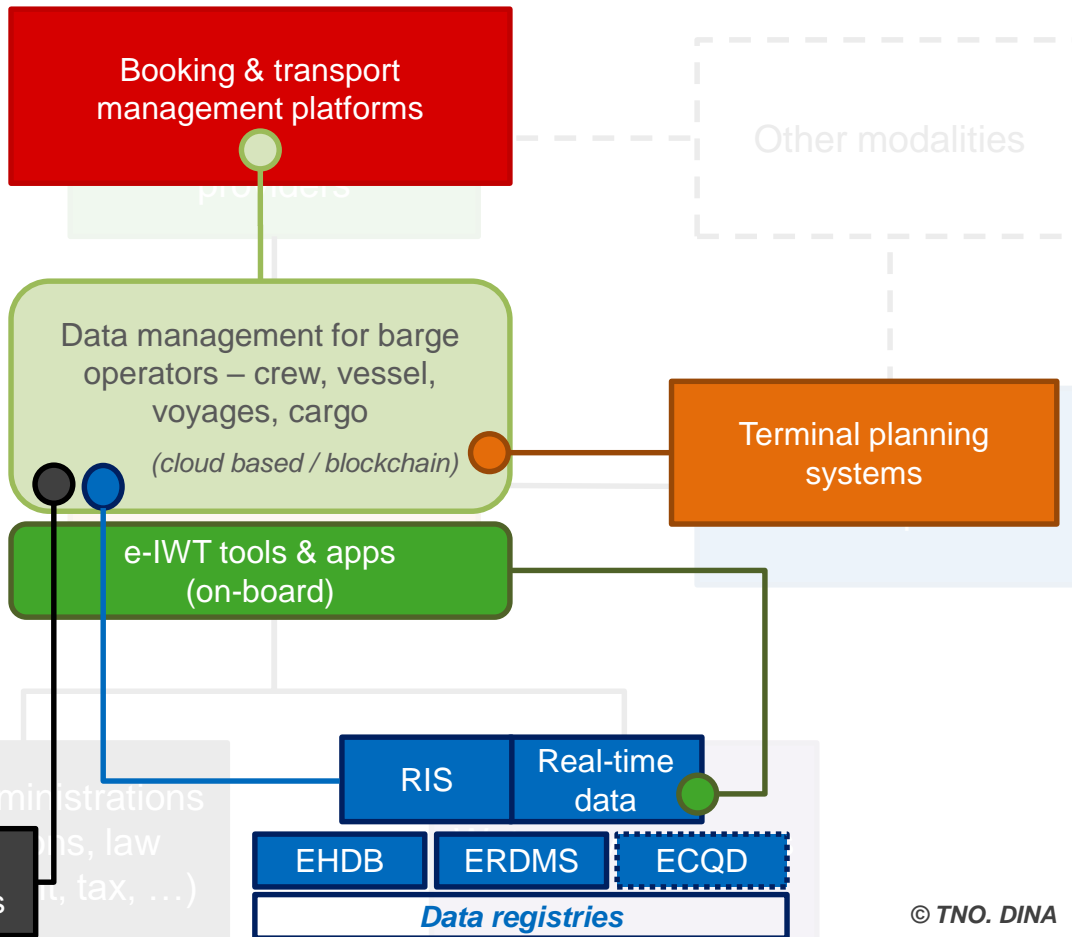1. More efficient navigation and traffic management

2. Integration in logistics processes

3. Reducing the administrative burden

Digitalisation *Simplified overview of actors*

Shippers and logistics service providers

Other modalities

Users of inland waterway transport

Barge operators
(on-board & on-shore: business & admin data)

(Inland) ports & terminal operators

Transport sector itself: barge operators, terminal operators and their links to other modalities

Public administrations (inspections, law enforcement, tax, …)

Waterway managers

Authorities (or agencies on their behalf) to perform certain public function, ranging from collecting & publishing statistics to calamity abatement and fairway management

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Digitalisation *DINA Architecture*

DINA Architecture

- ❑ An **extension of RIS**: providing additional (real-time) data, making them more interoperable and making the more useable for barge operators using new **on-board e-IWT tools**

- ❑ A **data platform for barge operators**: allowing theme to control their own data and operations. This should allow barge operators to share data in a controlled way with other stakeholders such as public authorities (for reporting purposes), (inland) ports and terminals

- ❑ An **integration with booking and transport management platforms of shippers and logistics service providers**. This should provide better visibility and better integration of IWT in the full logistics chain covering multiple modalities

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Note: the circle indicates the position of the interface, the colour indicates the actor who is responsible for the effort to connect to it.

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Digitalisation *DINA Architecture*

DINA Architecture
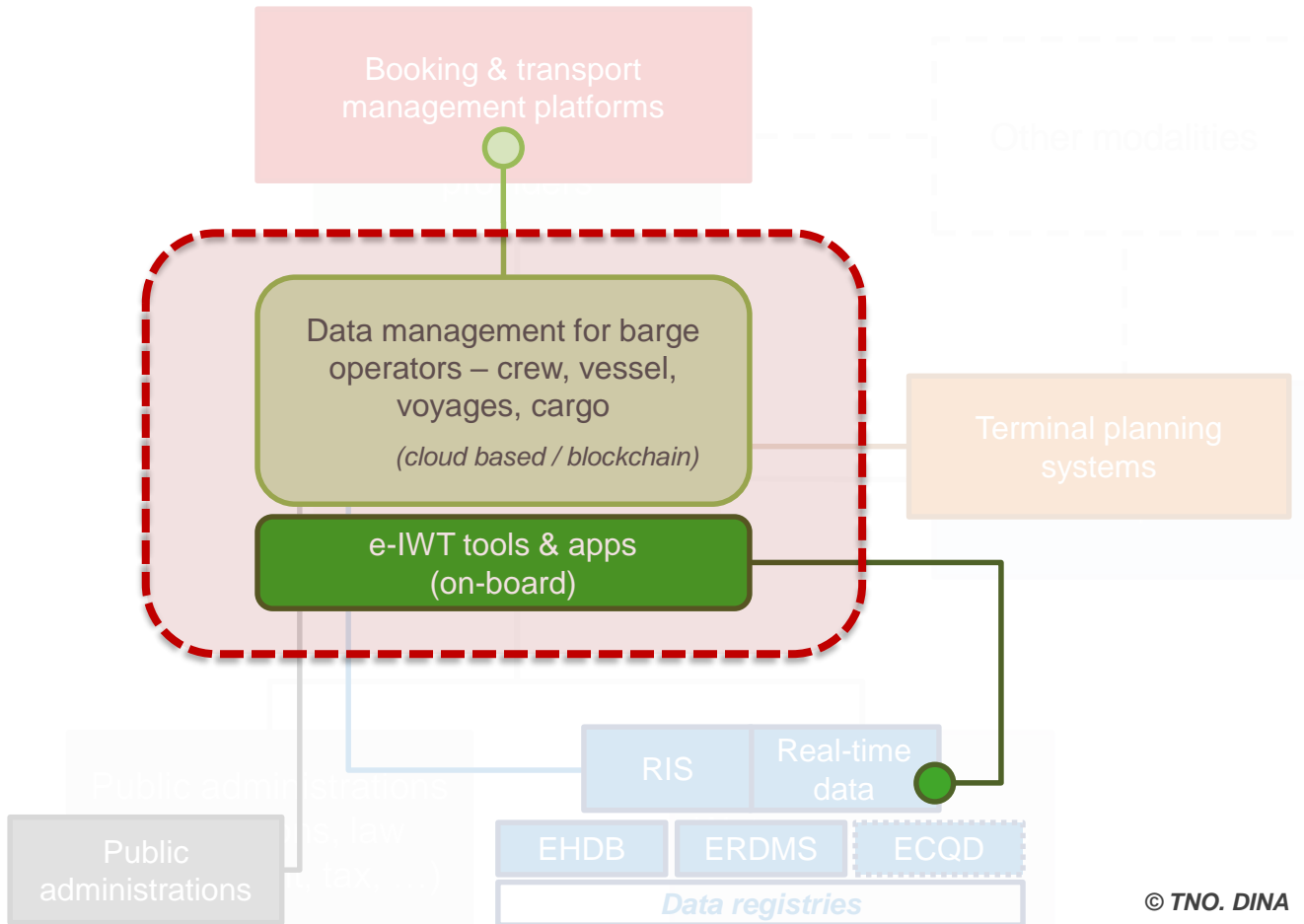
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Data & processes analysis *Starting point*
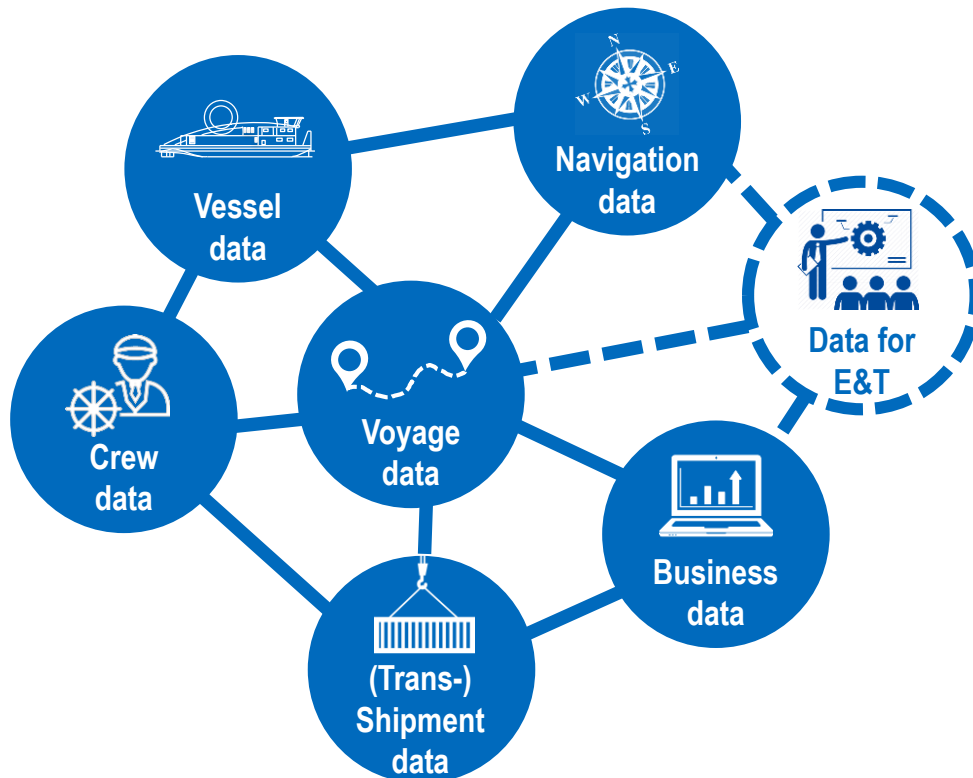
- Type of data collected
- Data source: where & how
- Owner of data
- Who uses collected data
- Use Cases - modelling

Vessel related data

Logbook

- Logbook with data entered daily or immediately when happen
- Oil control book
- *Attestation steam boilers, other pressure vessels*
- *Attestation for liquefied gas installations ....*

Documentation

- Inland navigation vessel certificate
- Installation and performance certificate for navigational radar installations and rate-of-turn indicators, for Inland AIS equipment and for tachographs in inland navigation
- Ship Station Licence (radio communication frequency)
- The Guide concerning the radiotelephone service on Inland Waterways
- ...

Reporting

To navigation authorities

- (mandatory on Rhine) Electronic reporting for container transport – for controlling purpose
- (mandatory on Rhine) Electronic reporting for tank ships – for controlling purpose

To port authorities

- Electronic reporting towards ports – for port fees, use of port facilities, info about "greening labels" for incentives provided by ports if the vessel is green etc.

Ship operation data

Inland AIS

- **Ship positions** & co. Purpose: traffic image & planning for authorities. Ownership: ship-owner. Collected: AIS transponder

Technical data

- engine performance, consumption & maintenance, div. monitoring alarms etc. → Purpose: (1) skipper to monitor the current operation; (2) technical department of fleet operator e.g. to optimise maintenance intervals, analyse sailing behaviour & optimise fuel consumption, voyage optimisation – bunkering, etc. Ownership: ship-owner. Use of sensors, IoT, AI, Data Analytics
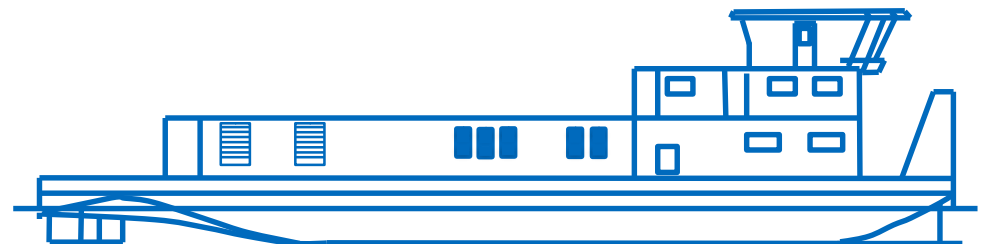
Crew related data

Documentation

- Skipper certificate
- Certificate for navigating using radar
- Radio operator's certificate
- ADN certificate
- ...

Service record book

- The service record book enables the boatman to attest his physical and mental fitness, his experience in navigation, and his qualification: section listing journeys undertaken; listing of qualifications obtained...

  Ownership: each crew member. Linked to the Logbook (in vessel related data)

Logbook (vessel & crew)

A logbook must be kept in the wheelhouse of every vessel, with the exception of port tugs and pushers, crewless push barges, Administration service boats and recreational craft. Responsibility for the presence of the logbook and the entries it must contain lies with the boatmaster.

- *Daily: operating mode, crew, for each crew member sailing and resting times*
- *Immediately: the time of the start of the first voyage of the day and the time of the end of the last voyage of the day, working times of each crew member, changes during sailing*

(Trans-)Shipment related data

Discharge certificate

- Proof of unloading, cleaning of the ship, taking over of transfer residue, washing water etc.

Loading certificate

- Proof of the obligation of the carrier in inland navigation to deliver the freight to the holder of the loading certificate at the port of destination

Bill of lading

- Proof of the obligation of the carrier in inland navigation to deliver the cargo at the port of destination to the holder of the bill of lading (content in many items identical to the consignment note

Shipping declaration

- A transit declaration (also: dispatch note) is an accompanying document for the cross-border transport of goods

Load / unloading plan

- Overview of loading conditions / stowage plan of inland vessel in preparation for loading / unloading

- ....
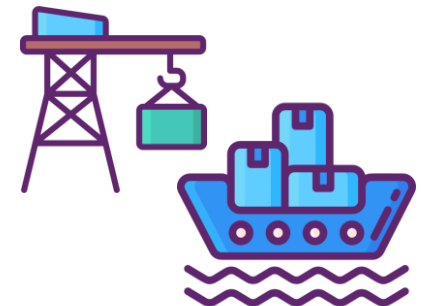
Voyage planning data

Notices to Skippers

- Info on maintenance work, temporary navigation limitations, etc.,
- information on ice conditions, water levels & predictions (increased prediction times),
- lock information (operating hours, closures)

Ownership: public available sources e.g. via RIS / NtS

Position data & ETA

- Real-time ship position and estimated time of arrival data (tracking / tracing)
- Collected: AIS / GPS transponder
- Purpose: Optimise vessel planning, interface with ports and other modes of transport
- Ownership: ship-owner

Status information to supplies

- Like „Proviant", supply of parts, fuel supply
- Collected: skipper
- Purpose: optimisation of voyage planning, when / where to bunker, get supplies on board, etc.
- Ownership: ship-owner

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Data relevant to navigation

Different systems available for navigational purposes (as data sources)

- Inland AIS
- Radar
- RIS
- Inland ECDIS
- VHF
- ...

→ Available equipment generates data and spread through the public infrastructure, e.g. position data
→ not suitable for the commercial

Data important for navigation

- **Position** (and condition) of own ship and other ships
- Information on the voyage (including water level, draft, currents, distances to e.g. bridges, quay walls, lock gates)
- Traffic information and weather information
- Lock information
- Berth and temporary transhipment points

Assistance systems

On-board systems

- Anemometer: wind speed and wind direction
- Tools / instruments for depth measuring
- Flowmeter
- Turning speedometer

Assistance functions

- Autopilot
- Mooring assistant
- Web guide assistant
- Track keeping system
- Controllers: for propellers, rudders, main & bow thruster, etc.

Use cases - modelling

DIGITALISATION ON-BOARD

► **digital tachograph**

► **digital inventory management** with eProcurement for fuel, spare parts, ship equipment... (ERP)

► **technic platform** / monitoring of engine & consumption data, sensors, interfaces to technology partners / shipyards ...

► fully **digital logbook** (automatized documenting of processes on-board)

DIGITALISATION ON-SHORE

(ADMIN & TECHNICS)

► Stowage plan

► Interfaces to cargo data

► Billing platform B2B

► Way bill / consignment note / bill of lading (transport documentation)

► B2G platform / interfaces

Use cases - modelling

DIGITALISATION VOYAGE

► **Interfaces disposition** *(automatic exchange of voyage data → exchange of ETA, berth data; coordination platform for a operational integration of ship & port / terminal operations)*

► **Barge-2-Barge communication** *(IoT & sensors - collection of real time (anonymous data), improved depth, flow measurements))*

► **digital lock slot allocation** *(integration of geo-fencing & capacity specifications → determining optimal lock occupancy and thus allows accurate predictions to locking slot)*
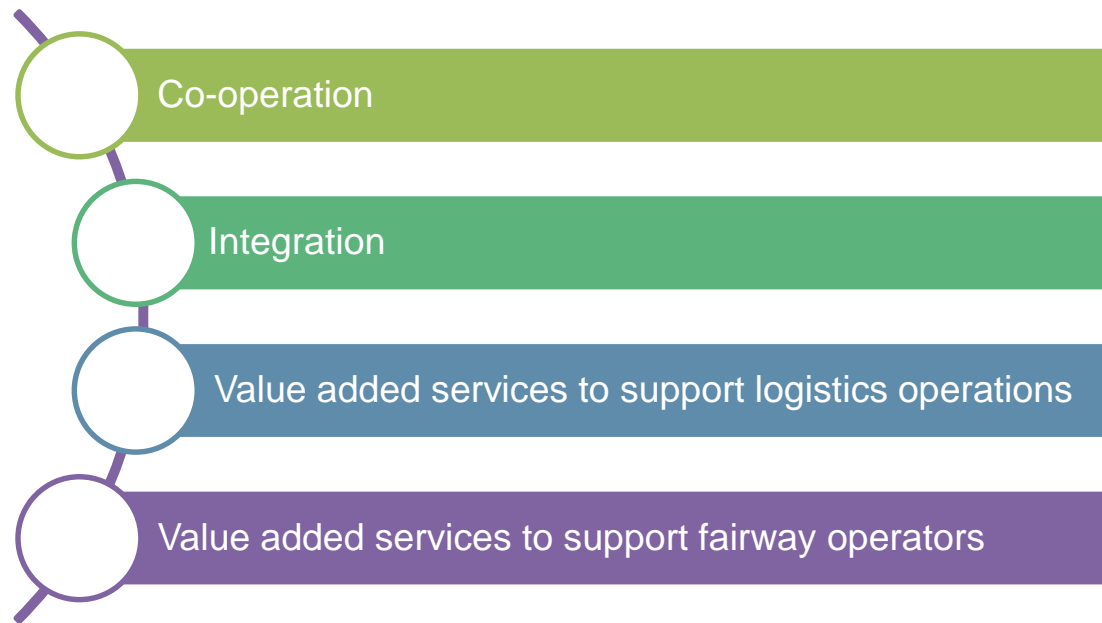
► **navigation support / assistance** for skippers ...

DIGITALISATION E&T

► e-learning platforms (to complete theoretical parts of education and training online

► Video-conferencing

► AR/VR glasses for simulate situations from the ship's everyday life & enrich theory (more accessible)

► regularly refresh content, especially in areas of safety

► Digital certificates

Guidelines (1/5)

- Besides environmental & economic performance, Danube IWT needs improved IT based logistics processes for full integration into managed logistics chains of industry
- **A general concept with recommendations on use & integration of tools, digital data & services in logistics processes was prepared**
- These recommendations are summarised on the following slides around four key elements:

Co-operation

Integration

Value added services to support logistics operations

Value added services to support fairway operators

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Guidelines (2/5)

- ## **Co-operation**

  - Continuous co-operation of the national services involved in RIS

  - Continuous co-operation between authorities and logistics stakeholders

  - Take-over of deployments and deployment experiences from relevant projects and initiatives

  - Elaboration of further development plans by considering user feedback

  - Promotion of national best practises on international level (e.g. usage of PAXLST)

  - Integration of solutions (such as information with relation to port / terminal / berth management, statistics, waste disposal)

  - Development of a central RIS website (one-stop-shop) in line with the relevant actions´ and initiatives´ content and keeping it up-to-date

  - Development of a central mobile application with continuous updates in a reasonable manner

Guidelines (3/5)

• **Integration**

- All countries shall participate in the international exchange of RIS data with special focus on position and electronic reporting data

- All countries shall connect to the European Hull Database

- Continuous elaboration and publication of inland electronic navigational charts and providing updates

- Permanent provision of reference data and their updates concerning the entire Danube section into the ERDMS

- Application of the corridor-level planning and management supporting the better utilisation of the Danube as an international transport backbone

- Maximal possible harmonisation of the IT solutions with the partner countries´ systems

- Permanent consultation with the sector:

    - Logistics stakeholders

    - Shipping companies

    - Authorities

Guidelines (4/5)

- ## Value added services to support logistics operations

  - Development and provision of value added services based on the data derived from the RIS systems, such as:

    - Operative usage of the electronic reporting infrastructure and acceptance of ERINOT, ERIRSP and PAXLST messages as fulfilment of reporting requirements

    - Automation of statistical data collection by using RIS information

    - Providing real-time information towards the connected systems in order to provide complex and integrated services for the IWT sector (e.g. Danube FIS Portal) for the sake of (voyage) planning

    - Providing standardised interfaces for the logistics stakeholders that enables them to fulfil reporting requirements, and to retrieve and integrate data into their own systems

    - Harmonised use of the DAVID forms

Guidelines (5/5)

- ## **Value added services to support fairway operators**

  - Integration of RIS data provided by the waterway management organisations with updates, including the inland electronic navigational charts´ basic data, water level and fairway marking information etc.

  - Utilisation of RIS data when elaborating the fairway marking plan

  - Analysis and utilisation of RIS data when planning and rolling out maintenance dredging

Conclusions (1/2)

- Several set of digital data & services are available, however, Europe-wide integration of these is of high importance

- The provision of digital services towards logistics stakeholders to support their processes is of high importance

- As the COVID-19 crisis demonstrates, the flow of goods in Europe is a key political and strategic topic that can / shall be supported by digital means:

    - **Digital documents of the crew**

    - **Digital documents of the vessels**

    - **Digital tracking & tracing of the cargo**

    - **Digital administration of the voyage towards the authorities**

Conclusions (2/2)

The GRENDEL project and the recommendations of it clearly support the achievement of the targets established in the revised EUSDR Action Plan´s for PA1a

ACTION 2: Foster business development

ACTION 3: Facilitate fleet modernisation

ACTION 4: Support the further roll-out and enhancement of River Information Services

ACTION 6: Contribute to the simplification, harmonisation and digitalisation of administrative processes

with which it is to support the optimisation of logistics processes with a green and efficient Danube fleet

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GRENDEL "Green and efficient Danube fleet"
Towards modernisation & greening of Danube inland waterborne
sector and strengthening its competitiveness

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