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hint
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DANUBE SCHOOL SHIP

Concept

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Work Package 4: Danube school ship and simulator strategy
Act. 4.2: Danube school ship requirements and concept

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LIST OF ABBREVIATIONS

BMA	Bulgarian Maritime Administration
BME	Budapest University of Technology and Economics
CERONAV	Ceronav - Romanian Training Centre for Naval Transport Personnel
DNS	Danube Navigation Simulator
DSS	Danube School Ship
FPZ	Faculty of Transport and Traffic Sciences
HINT	Harmonized Inland Navigation Transport through education and information technology
INeS	Inland Navigation eLearning System
KVD	University of Zilina
NAIADES	European Action Programme for the promotion of inland waterway transport
NAIADES II	Promoting, greening and integrating inland waterway transport in the single EU transport area
NELI	Cooperation-Network for logistics and nautical education focusing on Inland Waterway Transport in the Danube corridor supported by innovative solutions
PLATINA	European Coordination Action supporting the implementation of the NAIADES policy package
PLATINA II	Platform for the implementation of NAIADES II
SBBH	School of shipping, shipbuilding and hydrobuilding
viadonau	via donau – Österreichische Wasserstraßen-Gesellschaft mbH

EXECUTIVE SUMMARY

Need for a Danube School Ship

The idea of a joint Danube School Ship - to at least partly solve the lack of qualified nautical personnel - was already borne some years ago. The partners of the international Danube educational project HINT (www.hintproject.net) have now further discussed this idea with potential users (interviews, workshops) and developed a pre-feasability study. Balanced acquisition of both knowledge and practical skills is an essential prerequisite of good training resulting in a highly performing crew on board ships. On-board practical training possibilities in inland navigation are unfortunately scarce in the Danube riparian countries, which makes the development of required competencies by inland navigation crew members very difficult.

Requirements in the Danube Region

To learn the requirements for a school ship in the Danube region, 51 companies and institutions in seven Danube countries have been interviewed, the majority of them nautical educational institutions, vessel operators, port operators or administrative bodies.

The **overall feedback was very positive** and the majority of the respondents (83%) is interested in making use of the ship. Regretfully, **only 35%** have the **possibilities to finance** a Danube School Ship, even to a limited extend, like the operating costs they actually generate.
Approximately three quarters of the target group would prefer the school ship to be a **common used infrastructure of existing educational institutions**. The vessel type shall be a **motor cargo vessel**, preferably with barges and it should be a **new/specific school ship construction**.

Another essential part of the requirement analysis was the identification of the Danube School Ship **user groups**. With 72% each, **apprentices** in the dual education and training system and **students** (with little practical experience in their education) would profit the most from the existence of such a vessel.
The **estimated number of users** is also very different in the seven participating Danube countries and ranges between 25 users in Austria and several hundred users in Romania.

The **most important skills** trained on board are:

- the emergency situations training,
- the manoeuvring/ ship handling and
- the navigation through locks and difficult areas.

The opinion concerning the necessity of **simulators on board** is ambivalent. Slightly less than the half of the interview partners (48%) think that they would be valuable on board.
Further education and training on board of the ship is also a very crucial issue for the interview partners in all of the involved Danube countries. Only 7% think that it is not necessary to have further training courses on board, the others would prefer to have them in national language (77%) and/or English (53%).

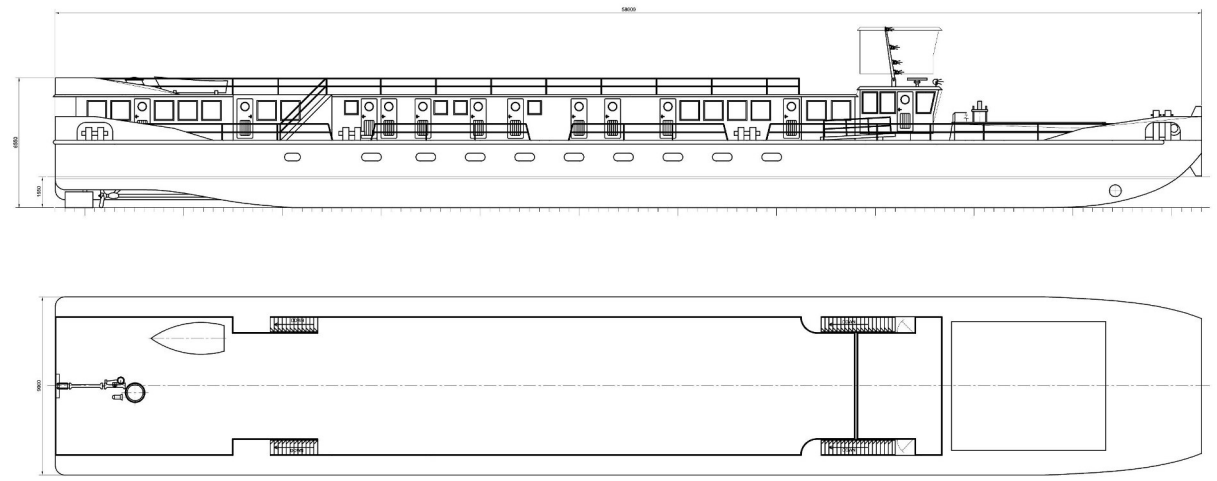
The results of the survey show **that gaining international experiences** is very important. Nearly three quarters of the respondents think that the students/trainees on board shall participate in international tours; having mixed teams on boards (students/trainees and teachers/trainers from different countries) would be the optimum solution for 65%.

The future Danube School Ship shall be **utilized the whole year round**. Although there are peaks in spring and autumn, there are also enough potential users during summer months and winter period.

Summary of Danube School Ship Concept

Aim of the concept at hand is to establish a framework for the use of a joint Danube School Ship and to build the basis for an acutal implementation project. The document describes a feasible manner for the technical, educational and organisational design of such a vessel. It furthermore outlines a cost estimation as well as funding options on a European level.

- **Vessel Design**
  The vessel will be a newly built specific school ship construction and will have accommodation for up to 22 students/trainees, 2 trainers and 4-6 crew members. The school ship will have a cargo space on board but will also have the possibility to push two 2 full loaded DE IIb barges.
  The detailed vessel design, including a detailed map, can be found in chapter 4.1 of the concept.



- **Organisational Structure**
  Organisational structures are crucial elements for conceiving viable corporations. They strongly influence financial budgets and decision making. Two legal forms of operating a school ship are outlined in the concept: the Limited Liablity Company and the Non-Profit Association.
  The detailed organisational structure can be found in chapter 4.2 of the concept.

- **Education and Training Concept**
  Needless to say, to train navigational skills is the main target of a school ship. Therefore, it has to offer a competence based practical training on board. The educational concept outlined in the Danube School Ship concept is based on the PLATINA Tables of Competences and considers approx.20 students on board of the vessel for training trips of 15 days, allowing for 120 hours of practice.
  The detailed education and training concept can be found in chapter 4.3 of the concept.

- **Tour**
  The tour of the Danube School Ship is influenced by the travel time of the vessel, the duration of training units on board and the estimated number of students per country. Considering the presumptions of the education and training concept, 480 students/trainees per year can be trained on board of the vessel, although the results of the requirement analysis show that it would be relevant for at least 580 persons.
  Considering this, an exemplary tour can be found in chapter 4.4 of the concept.

- **Estimated Costs**
  The estimated **acquisition costs** for the new school ship are between 2.1 and 3.2 million Euros.
  The estimated **standby costs**, including for example costs for crew, repairs and insurances, come up to approx. € 730,000 per year.
  The fuel consumption and therefore the **operation costs** are very hard to estimate, as they strongly depend on several factors. From this point of view, an estimation of 200,000 EUR per year seems reasonable.
  Considering that the vessel will be used for the tuition of 480 students per year (20 at the same time) for a period of 15 days, the training of one student costs about € 1.940 for 15 days or approx. € 130 per day.
  The detailed cost calculations can be found in chapter 4.5 of the concept.

- **Funding Options**
  This part of the concept describes, which potential funding opportunities and instruments exist for the design and the development of the Danube School Ship in the time period from 2014 to 2020.
  It is important to note that currently (spring 2014) most European programmes have either not been finalised or started yet with the exception of Horizon 2020.
  The detailed analysis of the funding possibilities can be found in chapter 4.6 of the concept.

INTRODUCTION

Current European documents such as the European Union Strategy for the Danube Region, the NAIADES II Action Programme, and the Strategic Framework for European Cooperation in Education and Training (ET 2020) emphasize the importance of education in the inland waterway transport sector underlining that

> „Danube navigation is currently experiencing a shortage of nautical personnel, which is also caused by limited training and education opportunities in the Danube countries. Existing education institutions use different curricula. In order to facilitate labour availability and mobility at the European level, common education and training profiles should be pursued. Within this framework, the Danube countries should attract and educate young people for the profession of Danube crewman. Companies involved in inland waterways transport (ports, shipping companies, customers, etc.) and educational and research bodies should establish educational platforms and networks to increase competitiveness and competence of all actors."[1].

One of the main aims of NAIADES II (2014 – 2020) is to significantly reduce barriers to labour access and mobility, valorise qualifications and careers in the sector and to create a level playing field. This shall lead to a skilled workforce and quality jobs in the sector.

And finally, the long term strategic objectives of ET 2020[2] are:

- making lifelong learning and mobility a reality;
- improving the quality and efficiency of education and training;
- promoting equity, social cohesion and active citizenship;
- enhancing creativity and innovation, including entrepreneurship, at all level of education and training.

Besides the pure educational aspects, training is also crucial for safety reasons. In this respect, practical training is of utmost importance. The effectiveness of practical training resides in the advance of professional competencies, employability of trainees and securing safe working conditions on board of ships.

Practical training complements theoretical knowledge acquired in class and renders training coherent and complete. It bridges the learning environment to work place through the hands-on experience. Introduction of modern learning tools such as simulators and school ships is encouraged so as they support education and training institutions to be able to educate necessary qualified personnel.

Practical training represents the period in which already acquired skills are consolidated, complemented and perfected and it provides the trainees with a real picture of the work place they prepare for.

Through on-board practice trainees get familiarized not only with the installations and equipment, but also with working conditions on board of the ship, they acquire appropriate general and specific professional competences and they get a glimpse of their future duties to be fulfilled according to applicable regulations and procedures.

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[1] Accompanying document to the European Union Strategy for the Danube Region, Brussels, 8.12.2010, SEC(2010) 1489 final, page 14

[2] Source: http://europa.eu/legislation_summaries/education_training_youth/general_framework/ef0016_en.htm, 20.04.2014.

1. AIM AND STRUCTURE OF THIS DOCUMENT

Aim of this concept is the definition of a framework for the actual realisation of a common school ship in the Danube region (pre-feasibility study).

After a brief outline of four best practice examples for (inland navigation) school ships in Europe in chapter 2, the concept goes on with the summary of the requirement analyses carried out for a Danube School Ship in the Danube region in chapter 3.

The actual Danube School Ship Concept is outlined in Chapter 4 of this document. Section 4.1 covers the technical aspects of the Danube School Ship and describes a feasible vessel design which responds to the results of the requirement analyses and a market research. Subsequent, chapter 4.2 outlines the legal organisation of such a vessel and chapter 4.3 specifies the educational concept, specifically focussing on the competences trained and practical exercise scenarios.
The travel times of the vessel, the duration of the training units as well as the estimated number of students per country determine the tour of the Danube School Ship. An exemplary tour plan, considering the requirements of the target group, can be found in chapter 4.4 of this concept.
After outlining the cost structure, consisting of acquisition costs, standby costs and operating costs in chapter 4.5, section 4.6 of the concept includes a detailed analysis of European funding possibilities.

To make sure that the concept comes up with the expectations of the potential users, the HINT partners have included a validation procedure. The results of the validation per participating country are outlined in chapter 5.

The concept closes with an outlook at the activities planned after the end of the HINT project.

2. BEST PRACTICE EXAMPLES IN EUROPE

Before starting the requirements analysis for a Danube School Ship in the Danube region and the drafting of the concept, the HINT project partners had a look at best practice examples all over Europe. Some of them have even been visited in the framework of a study visit tour. The following section describes three examples of good working inland navigation vessels and one maritime school ship.

2.1 Prinses Maxima & Prinses Amalia – The Netherlands[3]

The Dutch school convoy Prinses Maxima and Prinses Amalia started operation in February 2006 and is one of the most modern school ships in Europe. The acquisition costs of approximately 3.6 million Euros have been financed partly by inland navigation companies.
It is used for the tuition of future inland navigation personnel by the Maritieme Academie Harlingen and the Maritiem College Velsen. It is operated by the Maritieme Academie Harlingen.

The Prinses Maxima is a motor cargo vessel with a length of 50 m, a width of 8.0 m and a draught of 1.5 m. The height of the wheelhouse is adjustable and it provides a double steering post for students and trainers. The vessel provides accommodation for 24 students and 4 trainers.
The Prinses Amalia is a lighter with a length of 30.0 m, a width of 8.0, a draught of 1.5 m and a weight of 388 tons. It is a tanker lighter with all necessary equipment for loading and unloading. The bunker mast can also be used for the transhipment of cars.

[3] Source: http://de.wikipedia.org/wiki/Schul-Koppelverband_Maxima; 01.04.2014

The vessels have one teaching room each, the one of Prinses Maxima is lunchroom and recreation area as well. On board of the vessels, students learn how to handle the equipment of a modern inland vessel, how to navigate a pushed convoy and the loading and unloading of liquid cargo (coloured water).

The vessel hulls have been constructed by Turnu Severin Shipyard in Romania. After the transport through the Main-Danube-Channel to the Netherlands, they have been equipped in Krimpen/Lek by Smits B. V.

Technical details:

- 2 main engines Caterpillar 3406 C with 300 kW each at 2 four-bladed propellers, 1.200 mm
- 2 diesel generators 107.5 kVA each, Cummins 6BT5.9
- 1 diesel generator 66 kVA, Cummins 4BT3.9 G4
- 1 auxiliary power unit 15 kVA, Hatz 2L41C
- 2 bow rudders, Cummins M 11G2, je 283 kW
- Hydraulic rudder engine with four rudders
- 2 JMA 6o9 TFT inland navigation radar, GPS compass, double autopilot
- All operation and surveillance devices in the wheel house are available twice to allow interference of the trainer

Figure 1: The training ships Prinses Maxima and Prinses Amalia; Source: Wikipedia

2.2 Themis II – Belgium[4]

The Themis II has been visited in the framework of the HINT project during a study visit in May 2013. It is a genuine inland navigation vessel built for didactical purposes and intended to simulate as realistically as possible navigation in the currents, rivers and canals with highest traffic, as well as in associated locks and ports, in accordance with applicable regulations in force.

Operation of Themis II goes back to 10 October 2002 when the shipyard SKB, Antwerp completed the reconstruction of former vessel Romata built in 1965 (55 m x 7.20 m) and changed it into a modern school ship. The vessel received a new structure and was fitted with waterproof partitions. The bridge, lower deck, accommodation places, engines, equipment, tanks were all renewed and the new ship sailing under Belgian flag received from Bureau Veritas, on finalisation of works, the classification I 3/3 (E) N12 as passenger ship (hotel vessel) MACH (there is no classification as training ship).

[4] *Source: Report on need and opportunity of a Danube Training Ship and of commonly-used simulators; Study visit report of HINT*

17 cabins of 3 x 3 m each occupy a space of 13 x 5.5 m. A dedicated space of 6 x 5.5 m is used as lecture room.

The bridge is fitted with two working stations (master and slave), one station working independently. During training courses, the classical control station on the bridge is occupied by the trainee while the second control station is intended to the trainer. Electronic equipment is built in such a manner that should the trainee carry out a wrong manoeuvre, the trainer can immediately take over full control of ship. This double control arrangement allows the trainees to start learning manoeuvring procedures early in their training period without any risks to the two propulsion engines of the vessel and the ship itself.
The ship has a very practical design allowing easy maintenance and training of a class of 20 to maximum 28 students on board in everything they need to work in their future careers on an inland navigation vessel.

The propulsion equipment includes 2 Scania 360 PK engines, a 320 PK bow thrusters, 3 aggregates, 2 gearboxes and a hydraulic steering system. The ship is also fitted with all ICT equipment / technologies used in real life such as: radar, GPS, AIS, rate-of-turn indicator, depth indicator, compass, VHF, camera.

The purchase and retrofitting costs to the amount of 3.6 million Euros were covered by the Belgium government which is the official owner of the vessel. The operation costs are borne by KTA Cenflumarin, although the operation is carried out in co-operation with the Belgian government.

Figure 2: Themis II; Source: Wikipedia

2.3 Province de Liège - Belgium[5]

The school convoy Province de Liège has been built by the shipyard Gebr. Jooren for the École de Polytechnique in Huy. It started operation in 2012 and is now used for the education and training of future inland navigation personnel. The owner is Province de Liège C.E.F.A. Ecole Polytechnique de Huy.

The pushed convoy was built as follow-up for the previous school vessel Libertas. Due to its dimensions it is suitable for the navigation at the Canal du Nord. The convoy has an overall length of 85 m, which was necessary to reach the Belgian boatmasters' licence. The lighter can be navigated without the pusher on the Canal de Saint-Quentin. Both, motor vessel and lighter, are equipped with state-of-the-art operation and surveillance facilities.

[5] Source: http://de.wikipedia.org/wiki/Schul-Koppelverband_Province_de_Li%C3%A8ge

Construction and Equipment

The motor vessel is 50 m long and powered by 2 Scania diesel engines DI 12-59M with 260 kW each, operating two Veth-Z-rudder propellers. A four channel bow rudder Veth-Jet 4-K-800 operated by a 118 kW Sisu diesel motor supports manoeuvring. The electrical power supply is ensured by two Sisu diesel generators with 63 kVA each.

Accommodation for 20 students as well as a kitchen is situated below deck. The vessel crew is accommodated in the deckhouse. Furthermore, a teaching room is available on board of the motor vessel. The height of the wheelhouse is adjustable and it is equipped state-of-the-art.

The 34 m long lighter is a tanker to allow handling of liquid cargo. The handling of dry cargo can be trained by using the car crane on board. The lighter also possesses a teaching room and a small kitchen. A modern helmstand and a Veth bow steering propeller VSG 800 powered by a 100 kW electric motor allow the manoeuvring without the motor vessel. The electrical power supply is ensured by two Sisu diesel generators with 63 kVA and 134 kkVa.

Figure 3: Province de Liège, Source: http://www.provincedeliege.be/fr/node/2728

2.4 Kraljica mora – Croatia (Maritime School Ship)

The school ship *Kraljica mora* (eng. Queen of sea) is the first school ship in the Republic of Croatia. The ship is designed for educating students of naval schools and faculties. The financing program for the construction and using of a school ship was adopted by the Croatian Government in 2007 and is intended for students who are educated in naval schools and faculties. The ship was built in Brodarski Institute in Zagreb. The launching of the ship was carried out on November 13th 2009 in the shipyard Montmontaža - Greben in Vela Luka, Korčula Island. Ministry of Maritime Affairs, Transport and Infrastructure entrusted management of the school ship to the boat company Jadranski pomorski servis d.d. Rijeka and in March 2013 operation of the ship was taken over by Jadrolinija. Ministry of Maritime Affairs, Transport and Infrastructure funds the maintenance of the ship (crew and fuel costs) while faculties bear the food costs (estimation is 11EUR per person per day) and costs for naval school are paid by the county. School ship is used by schools that educate future navigators (secondary naval school in Bakar, Mali Lošinj, Zadar, Šibenik, Split and Dubrovnik) and Faculty of Maritime Studies in Rijeka and Split.

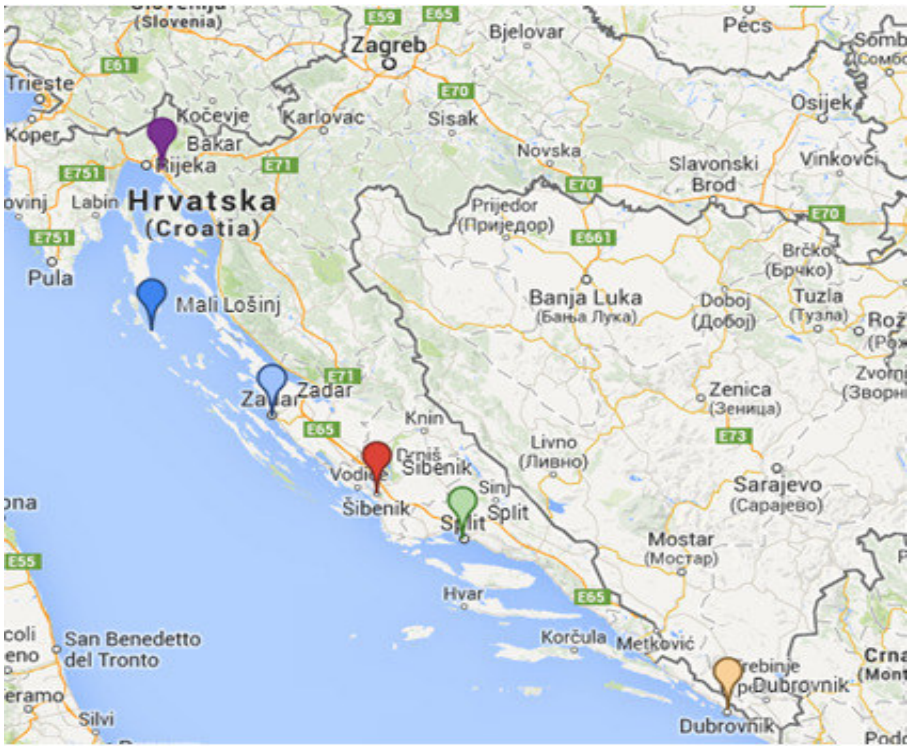

Figure 4: Geographical position of the naval schools and faculties

Technical specification of school ship:

Owner of the vessel	Ministry of Maritime Affairs, Transport and Infrastructure
Operator of the school ship	Jadrolinija
Navigation category	II (Great costal navigation)
The number of students that can receive	28; (teachers: 4; crew: 7)
Type of vessel	„logger ship“ motor sailing ship with two foremasts
Construction material	Steel
Length overall (hull)	35,00 m
Breadth overall	8,55 m
Main drive	2 x 373 kW at 1800 r/min
Speed vessel	11,00 knot
Speed sailing	6,00 knot
Cost of construction of vessel	5 million EUR

Organisational concept of the school ship:

The educational activities on board are carried out according to the Utilisation Plan, Plan of Travel and the Work Plan. The Utilisation Plan is adopted by the Ministry on the proposal of the Association of Maritime Schools. The Association of Maritime Schools submits a proposal of use to the Ministry no later than 31 May of the current year for the next school year. The Ministry is obliged to submit the Utilisation Plan to naval schools and faculties no later than July 1st of the current year for the following school year.

The ***Utilisation Plan*** for each institution determines:

- anchoring port of vessel during the use
- start and end date of using a vessel

The ***Travel plan*** determines the time and place of departure, the number of trainees and teachers as well as the time and place of signing off trainees and teachers for every trip of the same institution. Each institution delivers travel plan to the Ministry and the shipper at least 15 days prior to the departure or before the first trip, if the ship carries more trips to the trainees and teachers of the same institution.

The ***Work plan*** contains:

- list of teachers and trainees, with the personal data;
- timeframe of navigation or anchorage period in ports;
- plan for supervision of the use of classrooms and equipment on board;
- schedule assignments for preparation and distribution of food and cleaning residences and public spaces;
- all other information pursuant to which the commander and crew can provide efficient delivery of instruction and training on board;
- duties and obligations of trainees during their stay on board.

Each educational institution prepares an elaborate and study plan for their group of pupils/students. The participants are signing on as learners/students on practice, in order to acquire the officer positions in the deck or engineering plant, which is recognized as the training in Seaman's Passport (matricula). The following training is provided on board: safety of the shipping, using radar and means of navigation, engine operation, fire fighting, prevention of water penetration, abandoning of a boat and man over board in order to gain routine and speed of reaction. Theoretical classes are minimised during the training, the focus is exclusively on practical contents with necessary instructions to the crew members. Every day before the departure, students are familiarised with the tasks and activities for that day. At the end of the school cruising, participants receive an assessment of acquired skills, commitment and behaviour on board. School ship Kraljica mora as a publicly financed boat is exempt from paying harbour charges.

3. REQUIREMENTS IN THE DANUBE REGION

After getting an overview of the Inland Navigation School Ships in Europe, the HINT project consortium carried out a requirement analysis in the Danube region. Chapter 3.1 outlines the approach for the analysis. The chapters 3.2 to 3.9 describe the results of the interviews and workshops per participating country and chapter 3.10 summarises these national results as requirements for the whole Danube region.

3.1 Approach

The basis for the requirement analysis for an Inland Navigation School Ship in the Danube Region was an interview guideline (see Annex 1 to this concept), which included the following categories:

- Ship Concept
- User Groups
- Education
- Tour – International Experience
- Financing
- Comments

The interview guideline was drafted by the activity leader viadonau. The involved HINT partners – at least one for each of the SEE Danube countries – gave their valuable feedback. Together with a short Danube School Ship Concept Outline (see Annex 2), the final interview guideline built the basis for the face to face interviews in Austria, Slovakia, Hungary, Croatia, Serbia and Bulgaria. The Romanian project partners organised a workshop to get to know the requirements of their target group.

3.2 Requirements in Austria

Partner responsible for interviews:	viadonau
Interview partners:	1 IWT Educational Institution 2 Passenger Vessel Operators 1 Cargo Vessel Operator 1 Administration

The feedback from **4 out of 5 interview partners was very positive**. Only one of the interview partners does not see the need for a Danube School Ship at all and therefore did not answer to the specific questions.

The Austrian target group of the Danube School Ship prefers the vessel to be a **common used infrastructure**, which can be rented for their specific purposes.

The vessel type shall be a **motor cargo vessel** or a **pushed convoy**. The majority thinks that it makes sense to **reconstruct an existing motor cargo vessel**. The option to attach a school barge to an operating convoy was also very welcomed by the Austrian interview partners, as it would be a good alternative for a smaller budget.

The **facilities** on board shall be

- a dedicated teaching room,
- a kitchen and recreation area,
- an accommodation area for students and crew,
- an (engine) workshop ,
- sanitary facilities m/f,
- a possibility for a PC in the cabin,
- a fitness area, and
- a cook on board.

One of the interview partners had the idea that the school ship can also be used for apprentices in the gastronomy sector (e.g. cook, waiter).

The school ship shall be **constructed for 10 to 30 people**, depending on the vessel type.

The **main users** of the Danube School Ship in Austria would be **apprentices in the dual education system**. These are approximately 20 a year – 6-7 students in each of the three levels of education. The interview partners think that the vessel could also be useful for

- students to get a feeling of how to navigate a vessel,
- career changers and
- practitioners to take part in specific trainings (independent of navigation).

The **most important skill trained on board** for the Austrian target groups is the emergency training. Not so important is the technical training in the machine room and the handling of barges in a convoy. Other skills mentioned are man over board, giving orders, vessel propulsions and forms.

The opinion concerning the necessity of **simulators on board** is ambivalent. Half of the interview partners think that they would be valuable; the other 50% are completely against it. Students shall earn practical experiences on board of a vessel. Simulators are better situated in a training institution on land.

A **double steering post** on board of the Danube school ship is not necessary for the Austrian target group.

Further education on board of the vessel makes sense for all of the Austrian interview partners, both in national language as well as in English. Especially, licence courses would be good to maximise utilisation of the vessel.

Austria is very interested in **international tours** and **mixed teams** (all Danube countries), but several aspects have to be considered in this context:

- travel of the apprentices to and from the vessel,
- labour legislations of the specific person,
- language barriers.

Very interesting for the **tour** are mainly the neighbouring countries (from Regensburg to Bratislava – maximum Belgrade).

The following stretches of the Danube are of specific interest for the Austrian target group:

- free flowing sections,
- stretch downstream from Linz (Hößgang, Wachau, Schlögener Schlinge, Stretch below Vienna),

The **preferred months of use** would be October to April. As the main users in Austria would be passenger vessel operators, the summer months are not favourable. All in all, Austria would need the school ship for approximately 2 to 3 months a year.

The Austrian interview partners are **very interested in using the Danube School Ship**. Some of them are even interested in participating in **an international association running the vessel**. Regretfully, they **see no possibility to financially contribute** to the purchase and/or operation of the Danube School Ship. Only the compensation of the operation costs they actually generate is thinkable.
There are not enough users in Austria to justify the support of the ministry of transport, innovation and technology.

3.3 Requirements in Slovakia

Partner responsible for interviews:	KVD - University of Zilina
Interview partners:	1 IWT Educational Institution 2 Cargo Vessel Operators 3 Administrations

Status quo of training and education

At the moment, there exists no special vessel for education and training of new crew members in the Slovak Republic. Most new applicants train on the vessels (push boat with barges) of the biggest shipping company Slovak Shipping and Ports.
A professional education of crew members in the Slovak Republic is not obligatory. The state exam of crew members consists of the specialized subjects according to ECE/TRANS/SC.3/184. The exam is carried out by the State Navigation Administration.
Conclusion: The professional education should become obligatory.

Danube School Ship
The idea of a Danube School Ship was mainly supported by the educational institutions Tatra Marine and the Department of Water Transport at the University of Žilina, as well as the cargo vessel operator Slovak Shipping and Ports.
Slovakian navigation companies do not employ staff (students) without previous practical experiences. They have to justify this knowledge by having a valid certificate through passing the state exam. On the other hand, the students cannot pass the state exam if they did not take part in trainings on board of vessels. This is kind of a closed circle and also the same situation when Slovakian students apply for jobs on foreign vessels.
The Danube School Ship could solve this problem, by giving the students the possibility to earn practical experiences.
The school ship should be a reconstructed motor cargo vessel with the possibility for a pushing technology. It should operate through the fords, straits, shallows, difficult port entrances, lock chambers on the Danube River. Students should learn basic skills like manoeuvring, technical or emergency training etc.
On the other hand the state institutions do not support the idea of a Danube School Ship. They cannot imagine who will operate the vessel, how the school ship will be financed and how much a course on board of the vessel will cost.

3.4 Requirements in Hungary

Partner responsible for interviews:	BME - Budapest University of Technology and Economics
Interview partners:	3 IWT Educational Institutions 1 Passenger Vessel Operators 2 Cargo Vessel Operators 1 Administration

The practical training on a school ship is important and needed according to the opinions of the interview partners. Only one ship operator company said that they were not dealing with the education of their navigation persons, just the appropriate licenses and official documents mattered. Regarding to the Danube School Ship, the feedback from **6 out of 7 interview partners was positive, but the school ship owner education institutes would primarily prefer to use their own ship**.

The Hungarian target group of the Danube School Ship prefers **in equal proportions** the vessel to be a **common used infrastructure and/or to be a new education and training institution.** The institutions that already have a school ship prefer the common used infrastructure version.

The vessel type shall be a **motor cargo vessel with barges**, because in this case the ship can be used for practical exams. But in case the examination rules of navigation persons (helmsman and boatmaster) are changing, this need also alters. The majority thinks that an ideal Danube School Ship should be a new, special construction, but it makes sense to **reconstruct an existing motor cargo or a passenger vessel,** due to economic reasons.

The **facilities** on board shall be like on a passenger vessel (which can sail 5-7 days between ports), and these minimum facilities shall be extended as much "education" facility as possible, like

- a dedicated teaching room,
- a simulator room,
- an (engine) workshop ,
- a special wheelhouse for education (large area, master and slave navigation equipment, etc.)
- a large kitchen and dining room for training of hotel ship crew

Most of the interview partners expressed that the school ship should also be used for training of apprentices in the gastronomy sector (e.g. cook, waiter).

The Hungarian interviewed experts all agreed that the **number of students** on board should be **min. 15** but **max. 30** depending on the possibilities of the reconstructed vessel. The ship should have separate cabins for the constant crew (3-5 people), but the teachers (1-3 people in addition to the crew) can be accommodated with the students.

The **main users** of the Danube School Ship in Hungary would be **apprentices, students, career changers and practitioners.** These are approximately 15-25 a year, but this number can be 50-60 in case the ship is available for hotel crew training.

The interview partners think that the vessel could also be useful for the promotion of IWT and exhibition purposes.

According to the Hungarian interviewed experts, the ship should be able to train as much IWT skills as possible. This depends on the (re)construction of Danube School Ship (size, function, technical equipment). The most important **skills trained on board are different according to the education target**. For deckhands the practice of works on deck or in engine room, for boatmasters and helmsmen the practice in navigation, and for hotel crew the language and dealing with passengers are the most important skills to train, but all jobs need emergency training on board.

The Hungarian interview partners think differently about the necessity of **simulators on board.** Two third of experts told that simulators would be valuable, but the others imagined the navigation simulators in a simulator laboratory. Who advocated the simulators on board would use this tool as a floating simulator laboratory, which could be used even under sailing but in ports for local students/trainees.

A **double steering post** on board of the Danube School Ship would be useful for the Hungarian target group.

Further education on board of the vessel makes sense for all of the Hungarian interview partners mainly in national language, but the language trainings are also welcomed.

Hungary is very interested in **international tours** and **mixed teams** (all Danube countries).

The following stretches of the Danube are of specific interest for the Hungarian target group:

- Difficult navigation areas (e.g.: Kelheim - Regensburg),
- All river stretches, where the Local Knowledge Requirements are mandatory,
- For ship operator companies (who are not sailing along the whole Danube) the operation area of the Danube is important.

The **preferred months of use** would be the whole year, except the ship maintenance period in winter. The secondary schools (who do not own school ships) prefer the summer period (June-August), but the private training institutes (having trainees of career changers, apprentices, etc.) would prefer the "out of season" months: October to April. For cargo ship operator companies and for authorities (further training of their employees) there are no preferred months. All in all, Hungary would need the school ship for approximately 1 to 2 months a year to have 1-5 days long or 1-2 weeks long trainings.

The Hungarian interview partners are **interested in using the Danube School Ship, only the school ship owner education institutes are uncertain**. The education institutes (secondary schools and private training institutes) are interested in participating in **an international association running the vessel**, but the ship operator companies and the authority are not. Regretfully, they **see no possibility to financially contribute.** Only a passenger ship operator could rent the Danube School Ship, depending on prices. The school ship owner secondary school could financially contribute in case the Danube School Ship would be their ship.

3.5 Requirements in Croatia

Partner responsible for interviews:	FPZ - Faculty of Transport and Traffic Sciences
Interview partners:	2 IWT Educational Institutions 1 Cargo Vessel Operator 1 Passenger vessel operator

The feedback from all interviewed stakeholders was positive. Generally, all stakeholders are interested in participating in a program considering a Danube school ship that would serve the purpose of training future navigators but they all face the problems of financing the service.

All the respondents consider that the Danube school ship should be common used ship within existing institutions at the state level.

Concerning the most appropriate type of vessel used for training purposes, stakeholders have different opinions. They all have their own preferences (pushed convoy, motor cargo/passenger vessel, tank ship for dangerous goods and motor cargo/passenger vessel + barge(s). Considering the ideal school ship, the answers are homogeneous: most of the respondents consider that the ship should be entirely newly constructed school ship or that it should be a reconstructed existing vessel.

All respondents agree that the future school ship facilities on board should include all rooms: engine workshop, accommodation rooms, workshops and a kitchen with room for leisure time. Stakeholders also agree that the ship should be made to accept 10 to 15 students.

Respondents also consider the users of school ship should be all sort of life-long learning participants: apprentices - dual education system, career changers, practitioners and students with little practical experience within their education.

The schools ship should be constructed for 10 to 30 participants. The Danube school ship could be used 1-3 months per year.

Respondents believe that all of the skills listed in the table are important for development of skills on board. However, the most important skills that stakeholders specify are:

- Technical training (in the machine room);
- Handling of cargo;
- Emergency training.

Considering the simulator on board issue, half of the respondents consider that simulators on board would not be useful, and the other half consider it to be useful and that all of the simulators are equally important (ship handling simulator, radar simulator, cargo handling, engine room simulator, radio simulator, inland ECDIS simulator). All of the respondents consider the useful use of double steering post on the main bridge because of increased control by shipmaster.

All interviewed partners believe that the further education programs for life-long learning on board are helpful. Two out of four interviewed partners consider that the education should be in the mother tongue (with an emphasis on the RIS courses and emergency trainings) and the other two partners consider that course should be conducted in English (with an emphasis on the RIS course, fuel-efficient driving and emergency trainings).

Furthermore, half of the interviewed stakeholders seem to be interested more in national tours while the other two partners are interested in international touring in neighboring countries (Hungary, Serbia, Bulgaria and Romania).

All survey respondents are interested in navigation on the lower Danube and the Croatian part of the Danube, leaving the possibility for the navigation on the Sava River.

As the most preferred month of use of the school ship May and October are listed.

The most important reason for using the Danube school ship is further education for boatmen and all stakeholders seem to be interested in using the schools ship at the international level but because of the lack of financial resources and generally bad economic situation, there is no possibility for the financial engagement of the stakeholders.

3.6 Requirements in Serbia

Partner responsible for interviews:	SBBH - School of shipping, shipbuilding and hydrobuilding
Interview partners:	2 IWT Educational Institutions 1 Cargo Vessel Operator

The feedback from **3 interview partners was very positive**.

The Serbian target group of the Danube School Ship prefers the vessel to be a **common used infrastructure**, which can be rented for their specific purposes.

The vessel type shall be a **motor cargo vessel**. The majority thinks that it makes sense to **reconstruct an existing motor cargo vessel or pusher**. The feedback from one interview partner (SBBH) is different – they think that it needs to be a new/special school ship construction. They think that the training ship should have a special purpose, which is not possible if you reconstruct an existing ship – accommodation area is to be specially designed for the residence of student groups (different poles). The main bridge also must be able to duplicate controls and have dual navigation etc.

The **facilities** on board shall be:

- a dedicated teaching room – only one interviewee
- a kitchen and recreation area
- an accommodation area for students and crew
- an engine workshop

The school ship shall be **constructed for 5 to 15 people,** depending on the ship dimensions.

The **main users** of the Danube School Ship in Serbia would be **students (with little practical experience within their education).** These are approximately third or fourth grade of secondary education (17 or 18 years old). One of the interviewees thinks that the vessel could also be useful for career changers and practitioners to take part in specific trainings. **Estimation** of Navigation Secondary school from Serbia according number of users and number of days per one year are unexpectedly high – 80 students per year and 90 days per year.

The **most important skills trained on board** for the Serbian target groups are:

- the manoeuvring/ship handling,
- the emergency training,
- the use of River Information Services,
- the navigation through locks,
- the radar navigation under different weather conditions.

Not so important are the technical training in the machine room, the handling of cargo and the handling of barges in a convoy. Not relevant skills are the dealing with passengers/guests, the use of new technologies and the foreign language skills.

All Serbian interview partners consider it is not necessary to have **simulators on board.** Students shall earn practical experiences on board of a vessel. Simulators are better situated in an education institution on land.

A **double steering post** on board of the Danube School ship is necessary for education institution from Serbia. They consider it as very useful because that is a good way to transfer knowledge and experiences; furthermore, it is good for the safety of navigation. The Serbian respondents also think that the teacher for the practical subjects must be an inland captain. Only the interview partner from the shipping company considers that a double steering post on board is not necessary because each crew member has to learn to independently perform activities.

Further education on board of the vessel makes sense for all of the Serbian interview partners, but only in national languages, as follows:

- The River Information Services course,
- The Emergency Trainings,
- The fuel – efficient driving.

Serbia is mainly interested in **national tours** with **national teams.**

The following **specific stretches** of the Danube are of interest for the Serbian target group:

- Danube along Serbia for learning local knowledge requirements
- Danube along Serbia, because that is the best for Serbian students (a good section for learning navigation, financially feasible for schools from Serbia).

The **preferred month of use** would be October to May, but not more than 4 months a year. As the main users in Serbia would be educational institutions, the summer months (July, August) are not favourable.

The Serbian education institutions are **very interested in using the Danube School Ship.** All of them are even interested in participating in **an international association running the vessel**. Regretfully, they **see no possibility to financially contribute** to the purchase and/or operation of the Danube School Ship. Only the compensation of the operation costs they actually generate is thinkable.

There are not enough users in Serbia to justify the support of the Ministry of transport or Ministry of education.

3.7 Requirements in Romania

Partner responsible for interviews:	Ceronav
Interview partners:	6 IWT Educational Institutions 3 Cargo Vessel Operators 2 Administrations 10 Others

Ceronav organised a workshop to get to know the requirements of the Romanian target group on October 22, 2013 in the Danube port of Galati. The feedback received from a total of 21 organisations which had 25 representatives at the workshop **was extremely positive.** Entities covering the entire Romanian inland navigation sector, from education and training institutions to ship operators, inland waterway administrations, crewing agencies to inland shipping regulatory bodies **fully acknowledged the need for a Danube School Ship** for a suitable education and training system in the IWT sector.

Most of the responses indicated that a **new institution for international nautical education** was preferred for the Danube School Ship, however**,** preference for a common used infrastructure was rather high, accounting for roughly half of the replies **and most significant,** being indicated as best solution by vocational, high schools and higher education institutions with solid background in IWT education sector.

The vessel type in Romanian stakeholders 'opinion should be a **motor cargo/passenger vessel + barge(s**) or a **pushed convoy** and a **new/special school ship construction** was preferred by most respondents. A reconstructed pusher or a school barge attached to an operating convoy came only second and third in the preferences of Romanian stakeholders.

Respondents indicated that **facilities** on board should include following spaces, with almost unanimous preference for the first two as mandatory requirement for a Danube school ship:

- a dedicated teaching room,
- an (engine) workshop
- an accommodation area for students and crew,
- a kitchen and recreation area

Suggestions were also made that appropriate arrangements should be made on board for:

- a training room and special facilities for management of emergency/risk situations
- a wheelhouse connected to internet and RIS network

As for the number of trainees the school ship should accommodate replies ranged from **10 to 40** people, greatest number of respondents indicating however the figure **20** as most suitable.

Main users of the Danube School Ship in Romania would be **apprentices**. Romanian stakeholders also indicated **students, career changers** and **practitioners** as potential users of the school ship.

Respondents also indicated their organisations could use the Danube school ship for 20 to 200 people for periods ranging from five days to 160 days per year. The lack of interest in using the school ship shown by a high number of respondents (9) has no relevance for the overall interpretation of Romanian findings as it came from port operators.

All skills were rated by Romanian respondents as very important or important, with particular interest in **manoeuvring/ship handling, cargo handling, emergency training, use of information services, handing of barges in a convoy, radar navigation**. Protection of environment, local navigation rules and legislation were also mentioned as topics of interest for training carried out on board the school ship.

Existence of simulators on board was considered a mandatory requirement by a large majority of respondents, who indicated their preference for installation on board of a **ship handling simulator.** Other replies also indicated the necessity for an engine room simulator and a radar simulator while radio simulator, cargo handling and Inland ECDIS came only forth to sixth in their preferences.

A **double steering post** on board of the Danube school ship was also considered a mandatory requirement by the Romanian target group, respondents stressing necessity of same for both training and safety purposes and offering as arguments the lack of experience of trainees and the need for immediate intervention of the trainer in case of steering errors.

Most respondents, with only two exceptions, favoured **further education programmes on board the ship**, in both English and national language, and considered a special focus should be placed on emergency training, RIS courses and fuel efficient driving.

Romanian stakeholders are very interested in **international tours** and **mixed teams**, their interest as well as sustainability of future implementation of such tours being supported by a lack of language barriers – Romanian students attend appropriate English and German language classes. Should such international tours become a reality, Romanians are interested in tours made along all Danube riparian countries and even beyond, on the Rhine, with particular focus on stretches allowing students to become familiar with navigation on shallow waters.

Most Romanian respondents indicated summer months, from July to October as **preferred months for use** of the school ship, spring months being also mentioned by a relatively high number of respondents while winter months received little or no interest at all.

As an overall conclusion, most Romanian respondents are **very interested in using the Danube School Ship** stressing importance of practice on board a school ship for competitive training, acquisition of appropriate competences and skills, improvement of knowledge and education of trainees/ students or for assessment purposes. Interest in future use of the school ship is also highlighted by willingness of an impressive number of respondents, 17 in total, to participate in **an international association running the vessel** while seven respondents also expressed their availability to **financially contribute** to the purchase and/or operation of the Danube School Ship, the lack of interest in personal financial contribution of remaining stakeholders being dictated by lack of appropriate funds.

3.8 Requirements in Bulgaria

Partner responsible for interviews:	BMA – Bulgarian Maritime Administration
Interview partners:	2 IWT Educational Institutions 3 Cargo Vessel Operators

The Bulgarian interview partners were 2 IWT Educational Institutions and 3 Cargo Vessel Operators. More than half of them have a positive attitude regarding the Danube School Ship. All of them approached responsibly and answered to the questions listed in the questionnaire.

The target group of the Danube School Ship in Bulgaria is in opinion that the vessel shall be a **common used ship for existing national education and training institutions.**

The type of the ship shall be a **motor cargo/passenger vessel** or a **motor cargo/passenger vessel + barge(s)**. Only one of the respondents wants it to be a **pushed convoy.** More than half of the interview partners think that a **new/special school ship construction** has to be built. Others are in opinion that the vessel shall be **reconstructed existing motor cargo vessel**.

The **facilities** on board shall be:

- a dedicated teaching room,
- an accommodation area for crew and students,
- a kitchen and recreation area.

The school ship shall be **constructed for about 20 people**.

The **main users** of the Danube School Ship in Bulgaria would be **apprentices in the dual education system**. These are approximately 50 per year. The partners, who were interviewed, think that the ship could also be useful for:

- students with little practical experience within their education,
- practitioners and
- career changers.

The **most important skills, which have to be trained on board** for the Bulgarian target groups are manoeuvring/ship handling, emergency training, navigation through locks, navigation under the influence of wind and radar navigation under different weather conditions. Of small importance are handling of cargo, use of new technologies and technical training in the machine room. There were suggestions that dealing with passengers/guests is not relevant but learning of German and Russian languages is very important.

Having **simulators on board** is not necessary according to more than half of the interviewed partners. Small part of them thinks that they could be available on board. These who have such opinion deem the ship handling simulator and the inland ECDIS simulator shall be on board.

Two of the interview partners think that a **double steering post** on board of the Danube school ship is necessary. Others have no answer to this question.

Almost all of the Bulgarian interview partners have the opinion that **further education on board** of the ship is compulsory. All of those answered with “Yes” prefer national language to be used for education

purposes. Only one of the interview partners indicated the English language as an option for the education programmes.

Bulgaria is interested in both, **national** and **international tours** with **national teams**.

Very interesting for the **tour** are stretches near Bulgaria and Serbia, the Danube delta, the ports, stretches with limited depths, islands, channels of islands, bridges and etc.

The **preferred months of use** would be October to May.

The interview partners in Bulgaria are **interested in using the Danube School Ship**. Some of them are even interested in participating in **an international association running the vessel**. Unfortunately, they don`t have the possibility to **financially contribute** to the purchase and/or operation of the Danube School Ship.

3.9 Requirements in the Ukraine

The Ukrainian partner Odessa National Maritime Acacemy (ONMA) is a 10% partner to Ceronav and therefore has very limited budget in the project. It was not possible for ONMA to carry out a requirement analysis for the Danube School Ship in the Ukraine.

3.10 Summary of Requirements

To learn the requirements for a school ship in the Danube region, the HINT project consortium interviewed 51 companies and institutions in seven Danube countries, the majority of them nautical educational institutions, vessel operators, port operators or administrative bodies. Whereas the chapters 3.2 to 3.9 outlined the specific interview results per country, this section of the concept now summarises these national feedbacks and therefore builds the basis for the following chapters.

Ship Concept & Financing

The **overall feedback was very positive** and the majority of the respondents (83%) is interested in making use of the ship. Regretfully, **only 35%** of the interview partners have the possibilities to **finance** a Danube School Ship even to a limited extend, like the operating costs they actually generate.

Approximately **three quarters** of the target group prefer the school ship to be a **common used infrastructure of existing educational institutions**. Only **29%** think that the Danube School Ship should be a **new institution for international nautical education**.
Independent from the type of organisation, **two-thirds** of the respondents are **interested to participate in an international organisation** running the Danube School Ship, at least one in each of the seven participating Danube countries.

The vessel type shall be a **motor cargo vessel**, preferably with barges. The ideal Danube School Ship would be a **new/ specific school ship construction**. As this is also the most expensive option, a lot of the interview partners think that a **reconstructed motor cargo vessel** would be the most economical solutions. Only 22% of the respondents think a reconstructed passenger ship or pusher should be the technical backbone of the school ship (see Figure 5).

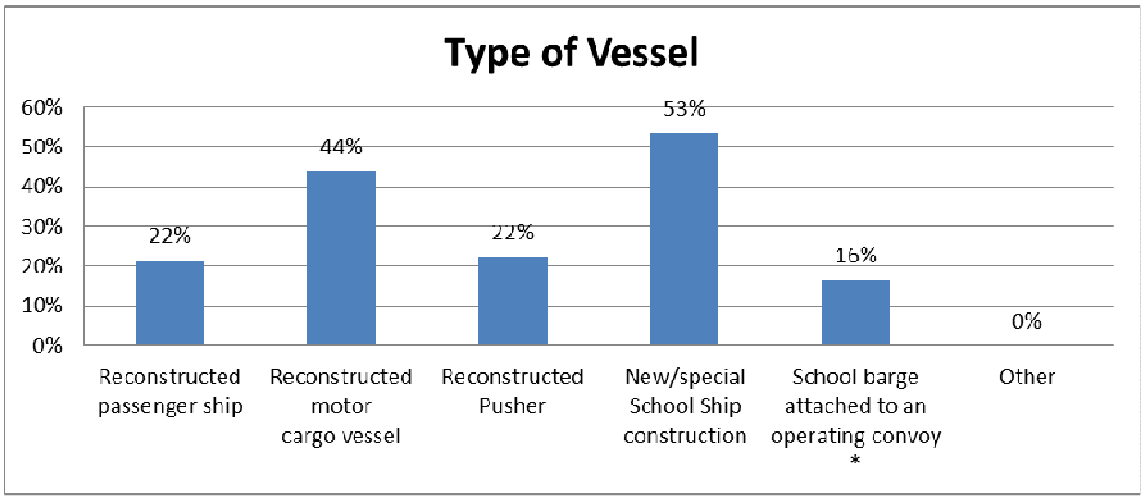

Figure 5: Evaluation "Type of vessel"[6]

The following list shows the significance of some **facilities on board** for the target group**:**

- an accommodation area for students and crew (69%),

[6] The option „School barge attached to an operating convoy“ was a lower budget option. Later on we learned that this solution is not possible due to legal reasons.

- a dedicated teaching room (67%),
- a kitchen and recreation area (66%),
- an (engine) workshop (58%)

These are some **further facilities** necessary on board mentioned by some of the interview partners:

- sanitary facilities m/f,
- a possibility for a PC in the cabin,
- a fitness area,
- a cook on board,
- a training laboratory and special room for management situations, and
- a wheelhouse connected to internet and the RIS network

The **estimated (student) capacity** of the vessel differs from country. The estimations reached from 5 to 50 students, whereas a capacity between 10 and 20 students was mentioned most often.

User Groups

Another essential part of the questionnaire was the identification of the Danube School Ship user groups. The status quo of nautical education in the seven Danube countries where the analysis has been carried out differs essentially. A detailed evaluation of the IWT education and training in the SEE countries has been carried out in the framework of NELI, the predecessor project of HINT. The NELI report "Identification and analysis of network requirements" can be found in Annex 3 of this concept.

The following table shows the **relevance** of the Danube School Ships for the **different user groups** per country. With 72% each, **apprentices** in the dual education and training system and **students** (with little practical experience in their education) would profit the most from the existence of a Danube School Ship.

User Groups						
Country	Apprentices (dual education system)	Carreer changers	Practitioners	Students (with little practical experience in their education)	Estimated # of users	Estimated usage time
Austria	100%	100%	100%	75%	25 users	3 months
Slovakia	60%	80%	20%	60%	30 - 40 users	3 to 5 months
Hungary	100%	83%	83%	67%	50 - 70 users (+ 50-60 hotel crew)	7 to 13 weeks
Croatia	100%	50%	25%	75%	45 - 65 users	4 to 5 months
Serbia	0%	33%	0%	100%	min. 110 users	5 months
Romania	67%	48%	48%	67%	several hundred users	whole year
Bulgaria	80%	40%	60%	60%	160 - 260 users	3 to 5 months
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Average	72%	62%	48%	72%		

Table 1: User groups

The **estimated number of users** is also very different in the seven participating Danube countries and ranges between 25 users in Austria and several hundred users in Romania. This is the same with the estimated usage time, which ranges between seven weeks and the whole year.

Education

The interview partners have been asked to rate a list of **skills** according to their **importance for on board training**. Table 2 shows these results.

How important is the training of the following skills on board 1 ... very important ::: 5 ... not relevant (except for Hungary):									
Skill	**Austria**	**Slovakia**	**Hungary ***	**Croatia**	**Serbia**	**Romania**	**Bulgaria**	**Ukraine**	**Average**
Manoeuvring/ ship handling	2,00	1,00	86%	1,25	1,00	1,10	1,00	n.a.	1,23
Technical training (in the machine room)	2,25	2,40	86%	1,00	2,33	1,29	2,50	n.a.	1,96
Handling of cargo	2,00	2,40	71%	1,00	3,33	1,52	1,40	n.a.	1,94
Dealing with passengers/guests	2,00	2,80	71%	3,00	4,33	1,81	4,40	n.a.	3,06
Emergency training	1,00	1,00	71%	1,00	1,00	1,24	1,00	n.a.	1,04
Use of River Information Services	1,50	1,80	71%	1,25	1,00	1,29	1,40	n.a.	1,37
Handling of barges in a convoy	2,25	1,20		1,25	3,33	1,14	1,20	n.a.	1,73
Navigation through locks	1,50	2,00		1,25	1,00	1,29	1,00	n.a.	1,34
Navigation under the influence of wind	2,00	2,00		1,75	1,33	1,38	1,00	n.a.	1,58
Radar navigation under different weather conditions	2,00	1,80		1,50	1,00	1,10	1,00	n.a.	1,40
Use of new technologies	1,75	2,20	57%	2,25	4,67	1,67	1,60	n.a.	2,36
Foreign language skills	2,00	2,40	57%	2,25	4,00	1,67	2,80	n.a.	2,52

Others:
man over board; speaking before people; giving orders; vessel propulsion; forms; handling of loading equipment; fuel; waste water; vessel maintenance; German language; LKR; team building; sailor way of thinking; protection of environment; Local Navigation Rules; Legislation

** The Hungarian interviewers used a slightly different questionnaire. Therefore the evaluation of this question is a bit different.*

Table 2: Importance of skills trained on board

The **most important skills** trained on board are

- the emergency situations training,
- the manoeuvring/ ship handling and
- the navigation through locks.

Not so relevant for the respondents are

- the dealing with passengers/guests,
- the learning of foreign language skills and
- the use of new technologies.

The opinion concerning the necessity of **simulators on board** is ambivalent. Slightly less than the half of the interview partners (48%) think that they would be valuable on board; 52% are against it. Students shall earn practical experiences on board of a vessel. Simulators are better situated at a training institution on land.
Table 3 shows the detailed results per country. Should simulators be available on board, it should be a ship handling, Inland ECDIS and/or radar simulator.

Simulators on board

Country	No	Yes	If yes, which ...					
			Ship handling simulator	Radar simulator	Cargo handling simulator	Engine room simulator	Radio simulator	Inland ECDIS
Austria	50%	50%	100%	100%	100%	100%	100%	100%
Slovakia	60%	40%	50%	50%	0%	0%	0%	50%
Hungary	33%	66%	100%	100%	0%	0%	75%	100%
Croatia	50%	50%	100%	100%	50%	50%	50%	100%
Serbia	100%	0%	0%	0%	0%	0%	0%	0%
Romania	32%	68%	100%	73%	53%	80%	40%	33%
Bulgaria	40%	60%	100%	50%	50%	0%	0%	100%
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Average	52%	48%	79%	68%	36%	33%	38%	69%

Table 3: Simulators on board

The results concerning the necessity of a **double steering post** on board of the Danube School Ship was explicit. Three quarters of the respondents deem such equipment as necessary.

Further education and training on board of the ship is also a very important issue for the interview partners in all of the seven Danube countries involved in this study. Only 7% think that it is not necessary to have further training courses on board; 77% think that such training courses shall be offered in national languages; 53% think that they shall be offered in English.

Further Education on the ship

Country	No	Yes - national language	Yes - English language
Austria	0%	100%	75%
Slovakia	20%	75%	50%
Hungary	0%	50%	100%
Croatia	0%	75%	50%
Serbia	0%	100%	0%
Romania	10%	60%	75%
Bulgaria	20%	80%	20%
Ukraine	n.a.	n.a.	n.a.
Average	7%	77%	53%

Table 4: Further education on the ship

Tour – International experience

The results of the survey show that gaining **international experiences is very important** for the respondents. Nearly three quarters of the interview partners think that the students/trainees on board shall participate in international tours. “National tour only” was mentioned by 28% of the respondents.

Having **mixed teams** on board (students/trainees and teachers/trainers from different countries) on board would be the optimal solution for 65% of the interview partners. Only 35% prefer the teams to be only national.

The future Danube School Ship shall be **utilized the whole year round**. Although there are peaks in spring and autumn, there are also enough potential users during summer months and the winter period. The following chart shows this demand.

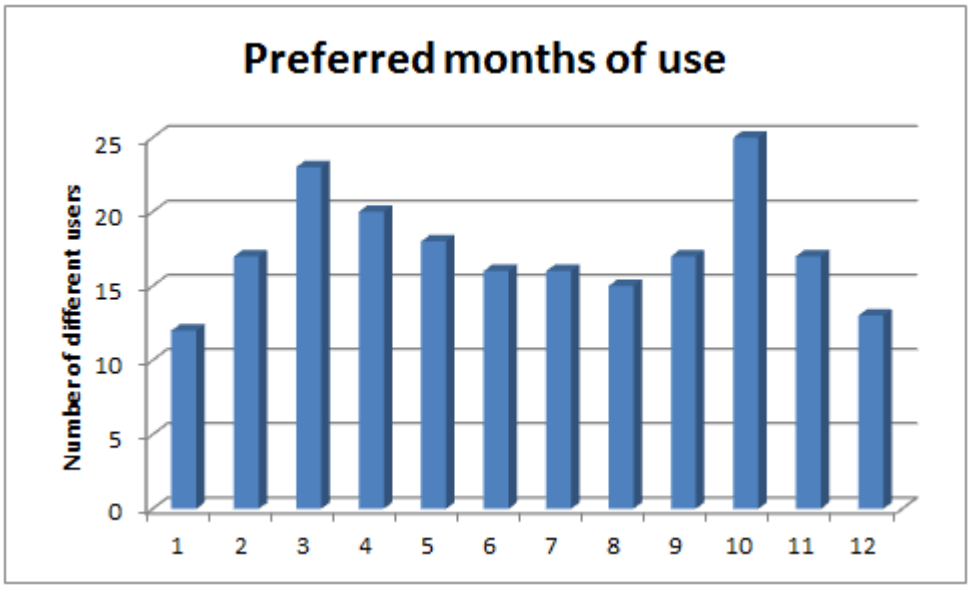

Figure 6: Preferred months of use

Please find the full list of the interview partners per country in Annex 4 and more tables and figures concerning the evaluation of the questionnaires in Annex 5 of this concept.

4. ACTUAL DANUBE SCHOOL SHIP CONCEPT

After learning about best practice examples of school ships in Europe and the summary of the requirement analyses carried out in the Danube region, this chapter now outlines the actual Danube School Ship Concept, consisting of the vessel design, the educational concept, the estimated costs and an analysis of European funding possibilities.

4.1 Vessel Design

This main part of the concept starts with the design of the Danube School Ship. After outlining the design parameters, the concept of a new/specific school ship construction is described in detail. Finally, the pros and cons of reconstructing an existing vessel are evaluated.

A higher resolution of the vessel design can be found in Annex6 of this concept.

4.1.1 Design Parameters

Basis for the vessel design outlined in this chapter has been an analysis of existing inland navigation school ships, the results of the requirement analysis (see chapter 3), the relevant regulations and the navigation environment. This method influenced the range of the main vessel dimensions, the functional and the machinery requirements.

Analysis of existing inland navigation school ships

As outlined in chapter 2 of this concept, two school ships have been visited during study visits in the HINT project and its predecessor project NELI, respectively.

A detailed description of the Dutch school convoy Prinses Maxima and Prinses Amalia can be found in chapter 2.1 of this concept. The description of the Belgian school ship Themis II can be found in chapter 2.2. The following table summarises the technical specification of the vessels

Ship name	Year of building	Length [m]	Beam [m]	Draught [m]	Main engine	Power of main engines [kW]
Prinses Maxima **Prinses Amalia (barge)**	2006	50.00 30.00	8.00	1.50	2 x Caterpillar 3406 C	2 x 303
Themis II	2002	55.00	7.20	1.50	2 x Scania DI 12 59M	2 x 298

Table 5: Technical specification of visited school ships

Furthermore, a mainly Dutch school ship database has been analysed as basis for the specification of the main dimensions (see the following table).

Ship name	Year of building	Length [m]	Beam [m]	Draught [m]	Main engine	Power of main engines [kW]
SMAL AGT	1961	54.05	9.18	3.29	Caterpillar 2 x 475 Hp -	708.4

					3408 DI-TA	
RPA 22	1961	24.60	6.25	2.46	Bolnes 2 x 220 Hp	328
PRINSES MARGRIET (I)	1966	69.23	12.00	4.50	Caterpillar 2 x 1379 Hp	2056.6
PRINSES IRENE (I)	1962	54.05	7.07	1.65	MAN 490 Hp	365.4
ERASMUS	1923	64.31	9.93	2.00	Werkspoor 2 x 625 Hp - TMS 357	932
JOHANN KÜPPERS IV	1894	54.50	7.40	2.30	Stoommachine 2 x 475 Hp	708.4
RIJNPOORT	1939	75.60	9.92	1.43	Caterpillar 2 x 527 Hp	786
FRANZ HANIEL XXI	1903	51.10	8.03	1.55	Sachsenberg 2 x 475 Hp	708.4
EMELI	1961	54.99	7.28	2.63	GM 2 x 240 Hp - 8 V 71	358
FRANZ HANIEL XIV	1909	74.90	21.30	1.65	Sachsenberg 1650 Hp	1230.4
PRINSES MAXIMA (I)	2007	55.98	8.00	1.50	Caterpillar 2 x 406 Hp	605.5
PRINSES JULIANA (I)	1931	38.85	6.37	1.80	Brons 150 Hp	112
NORA	1941	38.77	5.05	1.10	Scania Vabis 212 Hp	158
THEMIS II	1965	54.84	7.20	2.32	Scania DI 12 59 M 2 × 400 Hp	596.6
LAI DA TUMA	1950	39.40	7.84	1.69	MWM 2 x 610 Hp	910
OITUZ	1942	50.35	7.78	1.65	n.a.	1253
LEVENTINA	1921	38.50	5.05	0.40		
PRINSES AMALIA (I)	2007	30.00	8.00	1.50		
KONINGIN JULIANA (I)	1976	47.78	9.82	4.30	Industrie 1400 Hp	1044
PRINSES CHRISTINA (I)	1963	54.05	7.07	1.65	Caterpillar 485 Hp	361.7
PRINS HENDRIK	1890	24.75	5.80	1.60	Brons 70 Hp	52.2
PRINSES BEATRIX (I)	1960	53.80	7.08	1.65	Bolnes 250 Hp	186.4
SOPRON	1960	56.12	8.65	1.6	Láng 8 LD 315 RF 2×800 Hp	1193
HUNNIA	1921	37.33	6.72	1.65	Láng 6 KNCR 80 400Hp	596.6

Table 6: School ship database

The school ships analysed are measured between 24.6 m - 75.6m of length, 5.05m - 21.3m of width and 0.4m - 4.5m of draught. The power of the main engines lies between 52.2 kW - 2056.6 kW.

According to the database, the average size of a school ship is: 50m long, 8.28m wide and 1.99m of draft. The average age of school ships is 67 years, which could mean that they are mostly reconstructed vessels.

Functional requirements

According to the results of the requirement analysis (see. chapter 3 of the concept) and considering the best practice examples outlined in chapter 2, the Danube School Ship should give accommodation for 20-22 students, 2 teachers and 4-6 crew members. In day cruiser operation (e.g.: sightseeing, floating exhibition, etc.) the vessel should be available for up to 50 passenger.

This means that the Danube School Ship has to have accommodation for about 30 people, which also needs to be regarded at the kitchen, laundry, bathroom and storage (food, cloths, etc.) capacity. A larger room is also required for meals (breakfast, lunch, dinner) and education/training (classroom). The furniture of this room should be removable or changeable, because in day cruiser operation about 50 passengers have to be seated here.

The education/training on board is planned to be organized in groups of 5-7 students. For this purpose the Danube School Ship should have:

- a locksmith workshop.
- a relative large main and auxiliary engine rooms.
- a small cargo hold for demonstration of cargo handling.
- a large wheelhouse with master and slave steering position.
- enough deck area for anchor and winch handling (bow deck), handling ropes and rescue from water (stern deck), other deck works (e.g. cargo hold handling).

Pusher option: In some Danube countries the training ship has to push two loaded barges during the boatmaster practical examination. Because of this, the Danube School Ship should be able to handle and push two loaded barges. The hull has to be fitted with push brackets and appropriate coupling equipment has to be mounted on deck.

Machinery requirements

- ***Propulsion***

  The power of the main propulsion has to be determined by calculating resistance, taking the pusher option into account (two loaded barges). The minimum speed of the vessel has to be 13 km/h in calm water, according to the Danube regulations.

  The ship should have double screw propulsion, because of the relative shallow draught (max. 2m) and education/training purposes (how to navigate with two screws).

  The propulsion can be the conventional diesel with a reversing and reduction gear, but diesel - electric propulsion is also possible. Using alternative fuel (LNG, CNG, fuel cell, etc.) could increase the quality of the ship, but innovative technologies would raise the costs. That is why this study only considers commercial diesel engine propulsion.

- ***Auxiliary engines***

  The Danube School Ship is a special passenger vessel. Beside the propulsion it has significant auxiliary energy consumption, because of the kitchen, the refrigerators, the air conditioner, the rudder machine, the education "laboratories", etc. Based on example school ships the required power of auxiliary engines is about 2×200-250 kW.

- ***Bow thruster***

  For better manoeuvrability of the ship a bow thruster may be procured. Beside increasing navigability of the vessel, this tool also increases the navigation training quality.

Navigation requirements

- ***Navigation area***

The main navigation area of the Danube School Ship is the navigable waterway Danube and its tributaries.

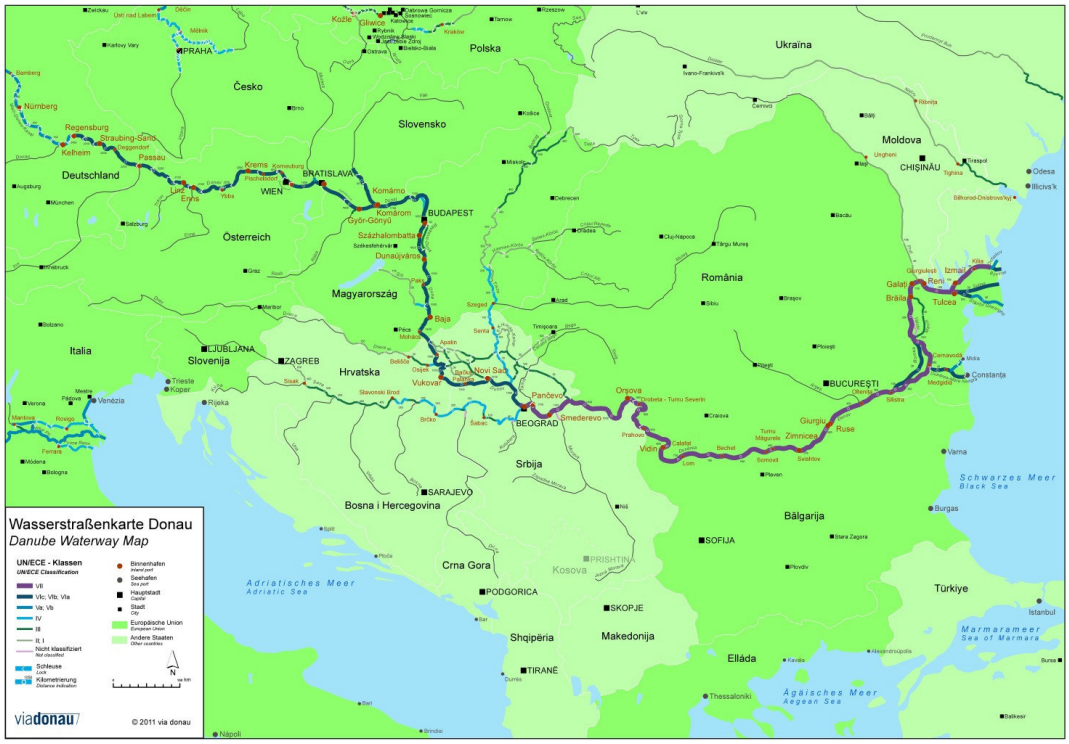

Figure 7: Danube waterway map, Status 2011, Source: viadonau

Regarding the ship design, the AGN classification of waterways helps to define the maximum dimensions of applicable vessels. The Danube as waterway is classified from Va. to VII AGN classes.

For better usability the vessel should be able to use the main tributaries of the Danube (at least in the estuary). This means that the smallest waterways where it should operate are the AGN Class IV waterways.

Class of waterway	Max. ship length	Max. ship beam	Max. ship draft	Minimum height under bridges
IV	80m - 85m	9.5m	2.5m	5.25m

Table 7: Maximum dimensions of ships in Class IV. waterway

The navigation practice gives some additional limits on the measurements. Because of some shallow water areas of Danube river stretches the ship´s draft should not exceed 1.6 - 1.8m. However the minimum height under bridges in class IV waterways is 5.25m, there are only 20 bridges along the Danube with less than 7m clearance by HNWL from the total 118 bridges. This means that the Danube School Ship can have 7m fix point height with an additional navigation limit by HNWL on the upper Danube section. From construction point of view the 7m fix point height can be fulfilled without wheelhouse lifting, but a wheelhouse lifting system is necessary to reach 5.25m fix point height.

- ***Navigation profile***

  The Danube School Ship needs fuel, fresh water, food and other stock storage capacities for 7 days of continuous operation. This means about 1000 km action radius upstream and about 3400 km action radius downstream.

  The number and qualifications of crew members have to fulfil the regulations determined by the specific law regarding the minimum safety crew, which is in accordance to the size of the ship, destination, area of navigation and ship class.

  For safety reasons, the minimum number of crew is higher for a passenger vessel than a cargo ship.

  From this point of view, the main operating mode of the Danube School Ship is “A1” (daily 14 hours operation). In this case the required crew is as follows:

Vessel in operating mode "A1"	Required number and qualification of crew
Self propelled vessel	1×boatmaster, 1×boatswain, 1×deckhand, 1×machinist
Self propelled vessel + 1 barge	1×boatmaster, 1×helmsman, 2×deckhand
Self propelled vessel + 2 barges	1×boatmaster, 1×helmsman, 2×deckhand, 1×machinist

Table 8: Minimum required number and qualification of crew in operating mode “A1”

Other operating modes that could occur depending on the specific training targets could be “A2” (daily 18 hours operation) or "B" (24hours of continuous movement). The latter requires unattended machine operation.

Vessel in operating mode "A2"	Required number and qualification of crew
Self propelled vessel	2×boatmaster, 1×boatswain, 1×deckhand, 1×machinist
Self propelled vessel + 1 barge	2×boatmaster, 3×deckhand
Self propelled vessel + 2 barges	2×boatmaster, 3×deckhand, 1×machinist

Table 9: Minimum required number and qualification of crew in operating mode “A2”

Vessel in operating mode "B"	Required number and qualification of crew
Self propelled vessel	3×boatmaster, 1×deckhand, 1×machinist
Self propelled vessel + 1 or 2 barges	3×boatmaster, 2×deckhand, 1×machinist

Table 10: Minimum required number and qualification of crew in operating mode “B”

4.1.2 New ship design

It is more advantageous to build a new vessel rather than fitting an old one to the specific educational and training purposes. In this case an ideal construction, among given boundary conditions, is possible and every required design parameter can be fulfilled.

Main dimensions

The Danube School Ship is a special vessel construction, because it is a cabin, cargo and pusher vessel at the same time. Considering its function, machinery and waterway AGN category No. IV., the requirements of the new Danube School Ship are 58m length, 9m width, 1.55m of draught and 5m of height (fix point height). In this case, the ship has to be equipped with a lifting wheelhouse, because the bridge clearance in waterway category No. IV. is 5.25m.

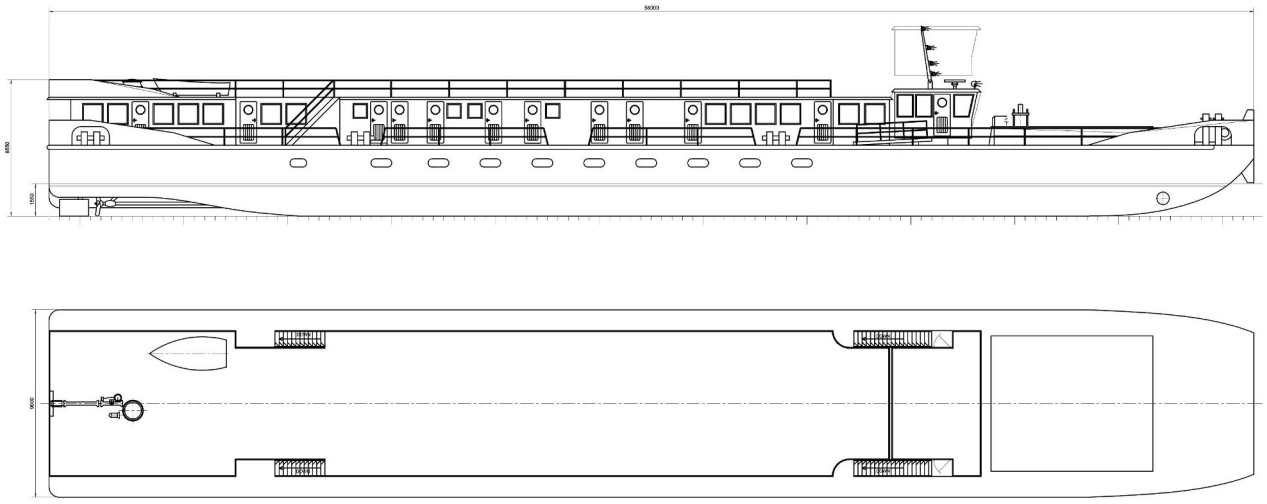

Figure 8: New Danube School Ship with lifting wheelhouse

However, the Danube School Ship with a lifting wheelhouse can navigate under the Danube bridges at every navigable water level, but it has some disadvantages as well. The wheelhouse would be situated at the fore part of the vessel, which makes the navigation more difficult. The lifting wheelhouse has to be placed on the main deck, what makes the ship 58m long. This length is more like a tug ship on the Danube than a pusher, but the navigation with two barges needs a short pusher.

In case the Danube School Ship only moves on the Danube, there are only 20 bridges with less than 7m clearance under bridges during HNWL. The ship can have 6.95m fix point height, a lifting wheelhouse is not necessary, and it can be placed on the top of the vessel. Without a lifting wheelhouse the Danube School Ship has 54.5m length, 9m breadth, 1.55m of draft and 6.95m of height (fix point height).

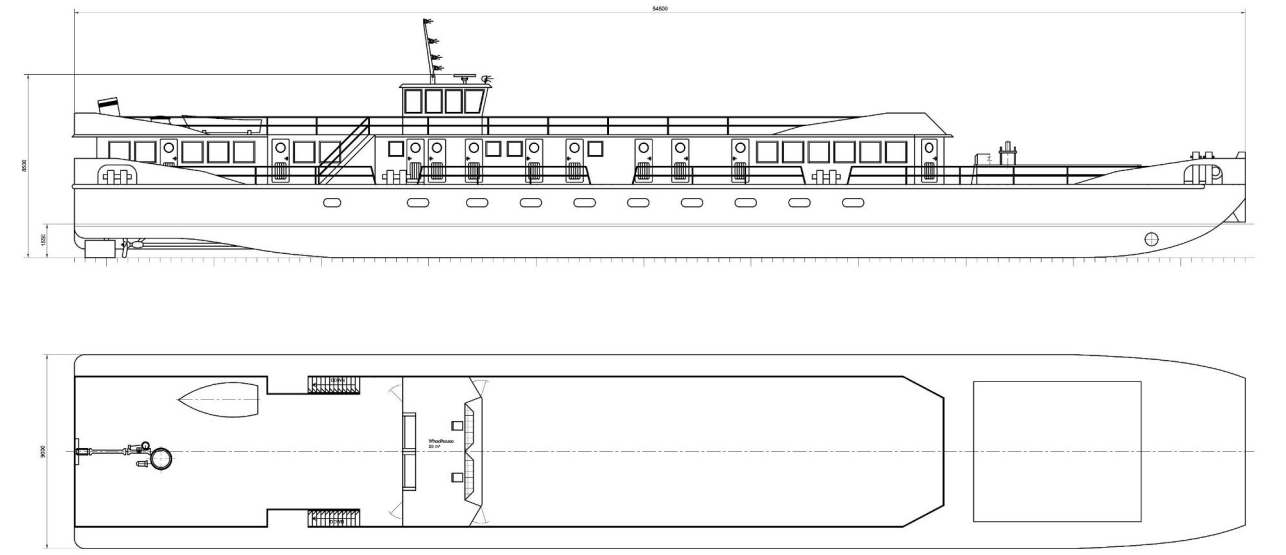

Figure 9: New Danube School Ship without lifting wheelhouse

General arrangements

The Danube School Ship has three decks either with a lifting or a non lifting wheelhouse. The first is the lower deck above the double bottom, which has 700mm height from keel. The second is the main deck 3200mm above the keel. The third is the top of the superstructure, the so called sun deck 5700mm above the keel.

Lower deck

The lower deck is inside the hull and divided into seven main areas by watertight walls:

- Stern collision space (between 0m-4m from stern)
- Boiler room (between 4m-9m from stern)
- Main engine room (between 9m-17.5m from stern)
- Accommodation area (between 17.5m-40.5m from stern)
- Tank space (between 40.5m-53m/49.5m from stern by lifting/non lifting wheelhouse)
- Bow thruster room (between 53m/49.5m-56m/52.5m from stern by lifting/non lifting wheelhouse)
- Bow collision space (between 56m/52.5m-58m/54.5m from stern by lifting/non lifting wheelhouse)

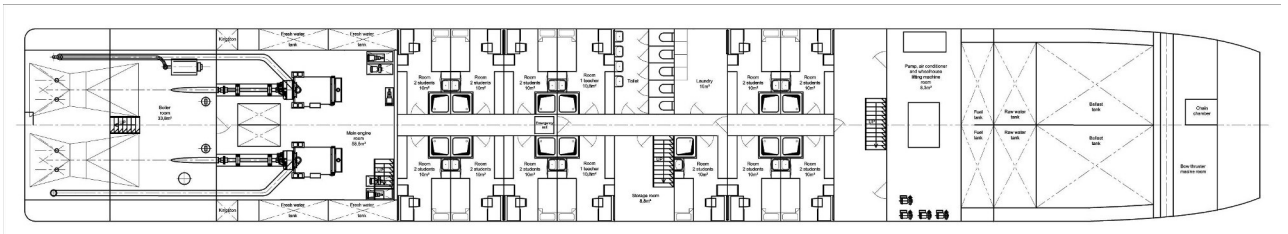

Figure 10: Lower deck arrangement of Danube School Ship with lifting wheelhouse

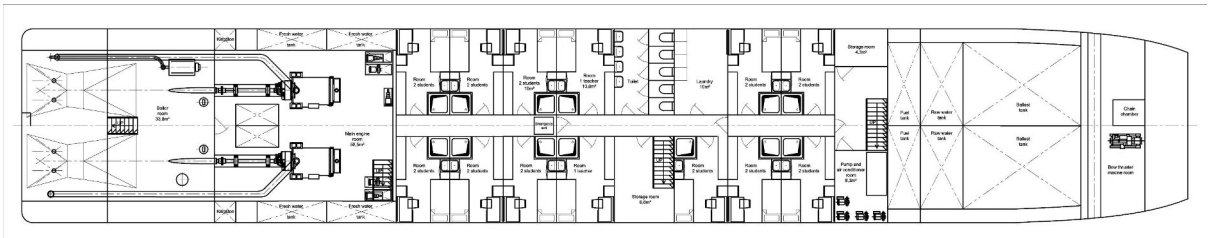

Figure 11: Lower deck arrangement of Danube School Ship with non-lifting wheelhouse

- ***Collision spaces***

  The stern and bow collision spaces are because of the safety and the regulations. The rudder trunks run through the stern collision space, but the rudder machines are on the main deck in the auxiliary engine room.

- ***Boiler room***

  The boiler for warm water and heating is located in the 33.8m^2 boiler room. This room is also for the warm water and Danube water hydrofors. The shaft tubes enters in this space into the hull, sealed with glands. This space communicates by two watertight doors with the auxiliary engine room and the main engine room.

- ***Main engine room***

  The machinery parts of propulsion (shaft, bearings, main engines, gearboxes, heat exchangers, fuel day tanks and pipe systems) are located in the main engine room, where the ship has a double side hull structure. In this double side are the fresh water tanks and the sea chest. The capacity of fresh water tanks must be about 32m^3 for 7 days continuous navigation. However the engines and other elements would not require 58.5m^2 room, this size of engine room makes it suitable for machinery maintenance trainings. The main engine room communicates by two watertight doors with the boiler room and the main deck.

- ***Accommodation area***

  The main part of the lower deck is accommodation area with 11 bedrooms for 22 students/trainees, 2 bedrooms for 2 teachers/trainers, a lavatory with 5 toilets, a laundry and a storage room.

  All bedrooms contain a shower, a sink, a table with chair and a cabinet. The student bedrooms are about 10m^2, and have bunk beds. The teacher bedrooms are a bit larger 10.8m^2, and have single beds.

  The rooms in the accommodation area are connected by a corridor. Because of safety reasons it is divided into three parts by two watertight doors.

  There are three opportunities to leave or to approach the accommodation area. In front of the corridor a staircase can be reached through a watertight door, which stairs lead to the education/training room on the main deck. In the middle of corridor are stairs to the right, open part of main deck. As an emergency option there is an emergency exit at rear of the corridor, what leads into a storage room on the main deck.

- ***Tank space***

  The fuel tanks are between the front wall of superstructure or the lifting wheelhouse and the cargo hold. Fuel tank capacity is about 40m^3. Under the bottom of cargo hold, in a 1.2m high space are the raw water and ballast tanks. Remark: The importance of ballast system is more educational than ensure the proper trim of the ship, because the vessel has only a few centimetres trim by empty cargo hold.

- ***Bow thruster room***

  The bow thruster room is located under the main deck, behind the bow collision wall. The horizontal axis, electric bow thruster, its tunnel and the necessary electrical system is installed in this space. The bow thruster room is accessible by a hatch from the main deck.

Main deck

The main deck is the top of the hull. Beside the open deck areas, the superstructure, the cargo hold – and in lifting wheelhouse version the wheelhouse and its lifting machine – are situated on the main deck.

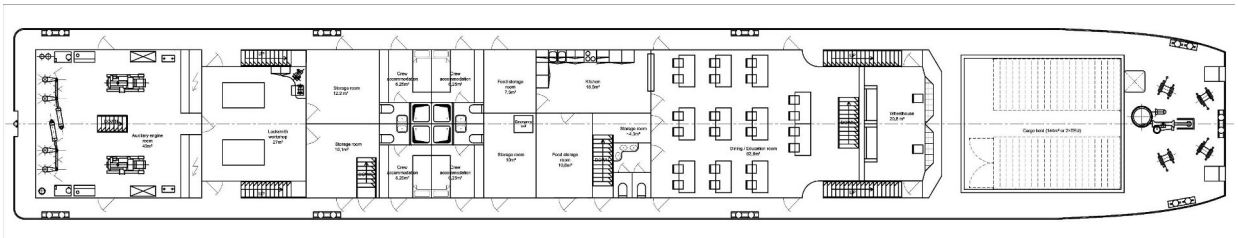

Figure 12: Main deck arrangement of Danube School Ship with lifting wheelhouse

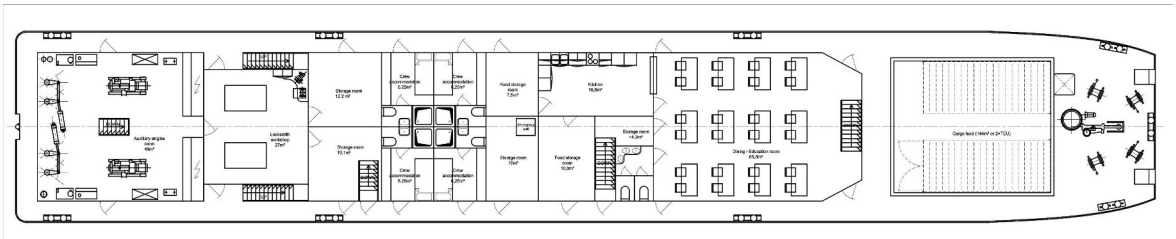

Figure 13: Main deck arrangement of Danube School Ship with non lifting wheelhouse

- ***Open deck areas***

  On the main deck there is a gangway around the superstructure. At stern the gangway is 1m wide, what allows training with ropes and practicing the rescue from water. The gangway on both sidse of superstructure and cargo hold is 0.95m wide. All doors of superstructure open to this area and stairs to sun deck and wheelhouse start from here. The side gangways are equipped with bollards for mooring and coupling of barges.

  The 35m^2 bow deck is before the cargo hold front wall. Hatch to the bow thruster room, coupling and mooring winches, bollards, rope chocks, the push brackets, and the bow anchor equipments are in this area.

- ***Cargo hold***

  The cargo hold is in the fore part of the hull, behind the bow deck and before the superstructure or the wheelhouse (non-lifting or lifting wheelhouse version). The cargo hold is 7.5m long, 6.2m wide, and 3.1m deep (with 0.9m high hatch coaming). It has about 144m^3 volume, and can be loaded with general dry cargo or two standard 20 feet container. The cargo hold is covered by a hatch cover, that protects the cargo from disadvantageous weather and allows practicing of hatch cover handling.

- ***Superstructure***

  The main part of the main deck is the superstructure, which has the following main areas:

  - Auxiliary engine room
  - Locksmith workshop
  - Storage rooms
  - Crew accommodation area
  - Food storage rooms
  - Kitchen
  - Dining or education/training room

  The 49m^2 auxiliary engine room serves as machine room for auxiliary engines, main electrical switchboards, rudder machines and emergency accumulators. Beside basic functions the large space allows machinery trainings too. The auxiliary engine room communicates with the side gangways, the locksmith workshop and the boiler room on the lower deck.

  The 27m^2 locksmith workshop is the education/training area, where locksmith works (like welding, cutting, assembling, etc.) can be trained. The workshop supplies stations for 5 students and is equipped with vise benches, electric welding machines, small cutting machines, grinding machine etc. The locksmith workshop communicates with the side gangways, the two storage rooms in front of it and the auxiliary engine room.

  Storage rooms in front of locksmith workshop have 12.2m^2 and 10.1m^2 area. Both storage rooms can be used for storing raw and education materials or different tools of education or ship operation. The storage rooms communicate with the side gangways and the locksmith workshop.

  The crew accommodation area consists of four 6.25m^2 bedrooms. Each bedroom contains a shower, a toilet with basin, a cabinet and a bunk bed. All crew bedrooms open to the gangway.

  Food storage rooms are beside the kitchen and have 7.5m^2 and 10.8m^2 of area. The smaller food store is for the dry and bottled foods, which does not require refrigeration. The larger food store is equipped with refrigerators. Both food storage room can be reached from the kitchen or the side gangways.

  The general storage room behind the refrigerated food store has 10m^2. It is for general storage (e.g. ship operation equipment, tools). This area communicates with the starboard gangway and has the emergency exit of the accommodation area on the lower deck.

  The kitchen has 16.5m^2, equipped with all necessary tools and machines needed for serving 30 people. The kitchen has direct connections with the dining or education room through a door and a dish window, which helps the quick serving of food.

The dining and/or education/training room has 65.5m^2 resp. 63.6m^2 depending on the construction of a lifting wheelhouse. This is a multifunctional room. In “education-room function” it is equipped like a classroom with chairs and tables for 22 students/trainees. In “dining-room function” the chairs and tables can be realigned for 44 people to have breakfast, dinner or lunch. In case the ship is in day cruiser operation and 50-60 passengers are on board, the tables can be folded and stored in the storage room behind the dining or education/training room to have enough clearance for passengers. Because of the classroom function this room is also equipped with flipchart, white table, projector and projection screen and one PC. The room can be left through 5 doors to the side gangway and the kitchen. The 4.3m^2 education tool storage room and a lavatory with two toilets can be entered through the back wall of the dining/education room. This room also communicates with the accommodation area on lower deck through stairs in the front.

Sun deck and wheelhouse

- ***Sun deck***

  Even if the Danube School Ship is built with a lifting or non lifting wheelhouse, the top of the superstructure is the sun deck. The stern anchor machine and the service boat are in the back part of the deck, the remaining area is empty and serves some board training. The sun deck can be reached by stairs from both side gangway of main deck.

  At the non-lifting wheelhouse version the wheelhouse is placed on top of the sun deck, but at the lifting wheelhouse version the wheelhouse is before the superstructure and the sun deck.

- ***Wheelhouse***

  The arrangement of the wheelhouse is different, depending on lifting or non lifting version. In both cases the area is larger than a regular wheelhouse (20.8m^2 or 25m^2), because it is equipped with a master and a slave steering post. Both has the same navigation equipments, but from master steering position the trainer can take over the control at any time.

  On the back side of the wheelhouse are seats or benches for observer trainees or for the examination board. The wheelhouse is designed for 9 people to stay.

  The difference in wheelhouse design lies in different access scenerios. The non lifting wheelhouse can be accessed over the sun deck through two doors on the back wall of wheelhouse, and the wheelhouse can be left at the front part of the sun deck through two front doors.

  At a lifting wheelhouse there are two moving staircases, which are corresponding to the height changes. The staircases are connected to the sides of wheelhouse. This design provides only two doors to reach or leave.

Machinery

Propulsion and main engines

The propulsion of the Danube School Ship has to be designed for navigation with two loaded Danube-Europe IIb standard barges at 13 km/h. Additional requirements for the navigation training is that the ship should be a twin screw vessel, because of this propulsion the navigation with two propellers can be practiced.

According to a preliminary resistance calculation, the required thrust of propellers is about 8.1kN. Taking into account two fixed pitches, 1.3m diameter screw propellers, the propulsion needs tunnels in the hull

and 2×375kW main engines. The calculated propeller load is about 6.6, which means that nozzle propeller is not required.

Figure 14: For example, an applicable main engine is the Caterpillar C9 ACERT "D"[7]

Auxiliary engines

The Danube School Ship is a special passenger vessel, which has large electric energy consumption while kitchen, air conditioning, training workshops, etc. are in operation. Due to regulations and safety reasons the Danube School Ship is equipped with two auxiliary engines. Based on example school ships the power of gensets should be about 2×200-250kW.

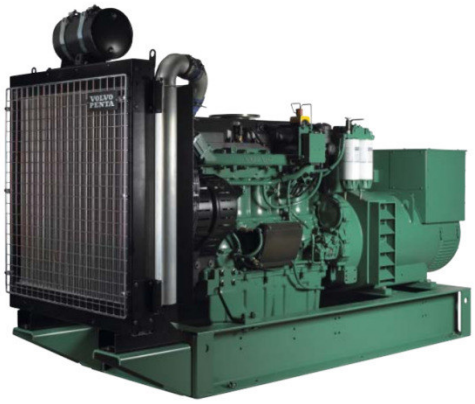

Figure 15: For example, an applicable genset is the Volvo-Penta D9 MG[8]

Rudder system and bow thruster

The rudder system of the Danube School Ship has to be designed for navigation with two DE IIb barges. Compared to the conventional pushers on the Danube, the Danube School Ship is longer than the average. Therefore, the vessel should be equipped with 2×2 main rudders behind the propellers, and 2×2 flanking rudders before the propellers. The rudder blades are moved by hydraulic pistons, the hydraulic power is produced by two independent hydraulic generators.

[7] Source http://marina.cat.com/cat-C9ACERTpc

[8] Source http://www.volvopenta.com/volvopenta/na/en-us/marine_commercial_engines/engines/genset_range/Pages/D9_MG.aspx

The deployment of a bow thruster increases manoeuvrability of vessels and the quality of navigational training. From design point of view the bow thruster has to produce side force against the wind pressure. The Danube is in the 3rd waterway region, where the bow thruster has to be designed for about 35km/h wind speed (Beaufort 5). In case of the new Danube School Ship this means that the bow thruster should produce 9kN side force. This requirement can be fulfilled with a 550mm diameter transverse channel thruster, driven by an 70kW electric motor.

Figure 16: For example, an applicable bow thruster is the Side-Power SAC 513[9]

4.1.3 Ship reconstruction

To learn about the needs concerning a Danube School Ship in the Danube region, a requirement analysis has been carried out (see chapter 3 of this concept). The interview partner preferred the school ship to be a new/specific school ship construction, as outlined in the previous chapter. Having a limited budget in mind, a lot of the respondents mentioned that the reconstruction of an existing motor cargo or passenger vessel into a Danube School Ship could be the better and more economic choice. During this investigation, it is assumed that the reconstructed vessel has the same functions, the similar dimensions (sizes, rooms, PAX, crew, etc.) and the education and navigation features are equal to the special school ship construction.

The main task is the selection of a vessel that can be reconstructed. Besides the required main parameters, the type, quality and price of the ship must be kept in mind. The conceptual design of the Danube School Ship cannot choose one available vessel; just the expected reconstruction range can be estimated considering the current used vessel market. The market observation is based on internet research and a vessel price report of viadonau carried out in summer 2012.

Passenger vessels are not available for reconstruction according to the used ship market analysis, because there are no used passenger vessels between 50m - 60m length for sale. The day cruisers are under 40m L_{oa}, and they do not have on board accommodation (sometimes just for crew). Those passenger vessels which have cabins are hotel ships or cruise ships, but their length is over 75m – 80m. Small ships are not suitable for having education/training rooms, workshops and accommodation for 30 people, but large ships are also not suitable because of too much space and high operational costs.

The suiting length of 55– 70m is found at the small dry cargo vessels market segment. The hull form is mainly not designed for pusher operation mode, and the propulsion is single screw propulsion. The main

[9] Source: http://www.side-power.com/public/templates/default.php?id=*SAC513-750

part of hull is the cargo hold, the living area is just for a small crew (4-6 persons). They are usually equipped with bow thruster, but the power of auxiliary engines is lower than the requirement of the Danube School Ship.

To fulfil the general properties of small general cargo vessels, the following reconstruction is necessary:

- **Steel structure:**
  The stern needs complete rebuilding for twin screw propulsion. Engine rooms have to be transformed for two main engines and new auxiliary engines. In case the hull is not designed for pusher operation mode, push brackets mounting and change of bow steel structure is needed. The existing superstructure has to be mainly removed, and the large part of the cargo hold needs to be transformed for the new lower deck and new superstructure. The establishment of new superstructure is necessary. In case the hull is hardly amortized (aged but cheap vessel), the underwater plates and perhaps a lot of stiffener (brackets, parts of watertight walls, etc.) have to be changed. This means that 65% - 70% of the steel structure needs to be reconstructed.
- **Machinery:**
  Because of twin screw propulsion need of Danube School Ship, two new main engine and propulsion systems have to be installed. The old auxiliary engines are designed for consumption of a small crew, so the auxiliary engines (and boiler) are also need completely change. The only machine which may remain is the bow thruster, if it is not too amortized.
- **Pipe and electrical systems, furnishing:**
  All of these systems need to be changed. Maybe the ballast, bilge and some parts of fuel system can remain.
- **Other equipments:**
  Depending on quality and amortization, the other equipment of a used ship are applicable after reconstruction. However, some renewal would be necessary. Because of the pusher operating mode a stern anchor system is required, and means new equipment if the vessel originally was not able to push barges.

According to the expected need of reconstruction it is hard to estimate if a reconstruction of a small general cargo vessel is more economical than a new construction. The main building cost components (machinery, pipe and electric systems, etc.) would be the same like the new Danube School Ship. Only the Steel structure could be cheaper, because the price of small general cargo vessels are between 0.15 – 0.6 million EUR (prices in year 2012). The ships under 200×10^3 EUR are mainly built before 1970, and the steel structure is probably highly amortized. The price of 6 – 10 years old (or in this time ago reconstructed) ships is close to the estimated steel structure cost of the new Danube School Ship.

The conclusion is that for economical ship reconstruction a beneficial situation on used ship market is needed, and a very accurate vessel survey is needed before purchasing the used ship.

4.2 Organisational Structure

Organisational structures are crucial elements for conceiving viable corporations. They strongly influence financial budgets and decision making. Therefore the legal framework surrounding an international enterprise, as the Danube School Ship is meant to be, needs thorough consideration of prospective field of action, equity and leverage acquisition, fiscal conduct etc.

Looking at present legal frameworks for businesses, two legal forms of operating a School Ship are envisaged:

- the Limited Liability Company (Ltd., Ges.m.b.H.) and
- the Non-Profit Association.

Both concepts have their advantages and disadvantages, starting at the foundation and ending at the fiscal conduct, hence presenting the legal framework for the two corporate characteristics. These are displayed according to the Austrian Business Act and the Austrian Association Act.

4.2.1 The Limited Liability Company

Start-up/Foundation:
Examining the start-up procedure limited liability corporations need to ratify the Company Agreement that needs a notarial certification, consisting of:

- company name and company address
- company purpose
- endurance and accounting year
- share capital details
- executive bodies/ organs
- management board and deputy management board
- general assembly
- annual statement of accounts/ profit share
- partition and transmission of company shares
- closure, withdrawal and liquidation etc.

Furthermore a business warrant needs to be procured if the company´s intent is to economically operate.

Hierarchical Organization:
The hierarchical structure is carried out according to number of shares acquired by the individual associate as mentioned in the Company Agreement. Every share ($,€ , assets, etc.) resembles one vote.

Representation to outside authorities:
The Ltd. company, due to its legal character, is legally responsible but not able to act hence installing an enabled managing board which is fully responsible at culpable conduct.

Liability:
The company is, in case of economical failure or damage, fully liable with its assets and capital. Associates are financially liable with only their share capital.

Controlling:
The company is obliged to conceive and publish their annual financial statement that must be commissioned externally as well as conduct double bookkeeping.

Tax and Insurance of employees:

- 25% Corporate Tax

- Reduced VAT
- 25 % Dividend Tax

Employees need to be covered according to their extent of work. Social insurance, employer tax, labour costs etc.

4.2.2 The Non-Profit Association

A Non-Profit Association can also conduct economic activities which are either charitable or fit to the associations purpose laid down in its club statutes.

Start-up/Foundation:
The club or association law can be of equal extend as the company agreement, but is not bound to publish financial details like share capital or share stock.

In its legal character, the association needs to clearly express its charitable character to gain subventions and to get fiscal advantages/reliefs.

Hierarchical Organization:
The hierarchic organization is less graded. Every vote of a Member of the Board has the same weighting.

Liability:
The association is, in case of economical failure or damage, fully liable with its club assets and capital. Associates, members of the managing board, are liable in their domain.

Controlling:
Small clubs are basically only responsible for the revenue - expenditure account and a balance sheet at the end of the financial year, which shall include a listing of assets and liabilities.

Medium clubs where the sum of ordinary income or expenditure exceeds, in mean, more than € 1 million over two years, are compelled to keep records and preparation of financial statements (balance sheet, profit and loss statement).

Big associations have to do an advanced accounting. This means they have to provide balance sheets, profit and loss statement, notes and a mandatory audit carried out by an external commission. Only if throughout two years more than € 3 million of income or expenditures, or € 1 million of donations are exceeded.

Tax and Insurance of employees:

- No/Reduced Corporate Tax if charitable character of association is given.
- Reduced VAT
- Reduced Fees (Authorities)
- No Dividend Tax

Employees need to be covered according to their extent of work. Entities of the board need social insurance if their reward exceeds “de minimis/ marginally employed” wage. Otherwise an accident insurance is obliged.

Aside the two given examples for structural organizations of the legal framework a separate approach shall be envisaged. The acquaintance and rental of the school ship by a single business partner. Our point of view includes no special properties if the legal framework is chosen alike.

4.3 Educational/Training Concept

This chapter outlines the educational/training part on board of the joint Danube school ship. It starts with the objectives of the training and goes on with the definition of pre-requisites. The main part of the educational/training concept is the description of the practical training exercises on board. The chapter closes with an example for practical exercise scenarios.

4.3.1 Objectives

Practical training on board an inland waterway ship addresses a diverse target group consisting of students, apprentices, career changers interested in embarking on a challenging career in inland waterway transport as boatmen on board river ships.

A **Boatman** is part of the operational staff carrying a set of complex activities on board inland navigation ships, activities which adequate possession of competences related to:

- full knowledge of the ship he is embarked on including structural characteristics, subdivision and arrangement of tanks, facilities on board, tools and bridge equipment, ship operation, performance and operational limits, deck installations and use thereof, with particular focus on ship's steering systems, mooring, tying, and anchoring operations carried out in various navigation conditions;
- deep knowledge of location and use of appropriate means, facilities and materials available on board in case of emergency situations such as water hole, fire, man over board, subject to requirements of specific emergency situations and in accordance with drills and standard procedures in place;
- familiarisation with medical first aid procedures in case of accidents on board;
- watch and guard service keeping;
- participation in preparation of ship for voyage (manoeuvres);
- participation to cargo loading/ unloading in special cargo handling facilities, familiarisation with cargo hatch covers opening/ closing installations, ventilation of cargo holds;
- participation in embarking and disembarking operations related to materials required for activities onboard ships;
- participation in ship cleaning and maintenance works;
- participation in the preparation and performance of exercises and special training drills intended to increase safety and security of ship.

Starting from the PLATINA Tables of Competences[10] trainers should prepare a practical training programme with adequately balanced modules in terms of their distribution throughout the duration of the voyage subject to relevance thereof so as to ensure accomplishment of the ultimate objective of practical training

[10] *See Annex 1 of the Platina "Consolidated tables of STCIN competencies", http://www.hintproject.net/download/blog/Consolidated_tables_PLATINA.pdf, 18.04.2014.*

on board a school ship as defined by the PLATINA Tables of competences requiring that on completion of voyage trainees are able:

- to assist in an adequate way with mooring and anchoring operations enabling the start or end of the ships voyage;
- to assist in an adequate way with sailing and manoeuvring of the ship in a nautical safe and economical way;
- to assist in an adequate way to prepare the ship for sailing in order to ensure a safe voyage in all circumstances.

Adequate acquisition of above competences shall be closely monitored throughout the voyage and certified by the final assessment of trainees demonstrating that they are capable on completion of the practical training on board to:

- identify ship structure and resistance elements;
- contribute to the maintenance of the ship and installations on board;
- perform specific boatman works;
- perform cleaning and maintenance works on board;
- effectively exploit the installations and facilities on board;
- intervene in emergency situations on board using appropriate installations and equipments for each situation;
- understand ship manoeuvring orders;
- perform the duties on board in compliance with applicable labour health and safety regulations.

4.3.2 Pre-requisites

For Trainees

Practical training on board of school ships is open to a large category of applicants and the definition of minimum requirements concerning the age of trainees. This is largely dependent on national regulations governing minimum age and to the category of trainees – students, vocational school students, career changers.

All trainees should however meet the applicable standards of physical and psychological condition set by statutory regulations in force.

For Trainers

Completion and successful graduation of a training programme on techniques and methods for the appropriate training of crew on board inland waterway ships and specialized background and expertise in the shipping activity are required for all trainers.

4.3.3 Facilities

A Danube school ship should be equipped with all facilities, equipment and accessories, repair and maintenance tools, internal communication systems, lifesaving and labour protection equipment, allowing

trainees to acquire applicable competences in appropriate real life conditions under highest safety conditions.

A comprehensive list of equipment, accessories, instruments and tools used for is given in the following section in the column “Facilities used”.

4.3.4 Competence based practical training on board

The practical training exercises defined in the following table have been planned with due consideration of the following arrangements:

- accommodation spaces for 20 trainees
- training trips of 15 days, allowing for 120 hours of practice

Competence	Knowledge, understanding and proficiency	Practical exercises for acquiring the competence	Facilities used	Hours	Assessment
1. Assist with mooring, unmooring and hauling (towage) operation	1. Knowledge and ability to use general equipment on board different types of vessels, e.g. bollards and winches of mooring and unmooring manoeuvres.	1.1 Ship berthing and departure manoeuvre from berth 1.2 Ship berthing and departure manoeuvre from pontoon 1.3 Ship berthing and departure manoeuvre from another ship 1.4 Towing manoeuvre 1.5 Berthing manœuvre to pon toon against strong wind from offshore	Mooring equipment on board Anchoring system Towing installation Deck equipment Ship mooring fittings ”Bow thruster” system Internal communication systems on board Drum ropes	12	Checking if ship mooring is carried out correctly Correct understanding and confirmation as such of orders received from wheelhouse
	2. Knowledge and ability to use materials available on board such as ropes and wires considering relevant safety measures such as use of Personal Safety Equipment (PSA).	2.1 Rope handling 2.2 Rope maintenance 2.3 Marline spike seamanship works 2.4 Seaman knots	Winches/capstans Ropes of various sizes and dimensions Marline spike seamanship tools Rope maintenance tools Labour and labour safety equipment	6	Inspection of marline spike seamanship works and assessment of ability to handle ropes on board. Identification of tools required for maintenance of ropes and execution of marline spike seamanship works.

	3. Communicates with the wheelhouse from the bow or aft using VHF and intercom communication systems and hand signals.	3.1 Use of the internal communication system on board the ship 3.2 Reception of orders sent from the wheelhouse for execution of certain manoeuvres 3.3 Use of hand signals during execution of various ship manœuvres 3.4 Use of VHF communication system on board for communication with other ships and port authorities	Internal communication systems on board the ship VHF communication systems on board the ship	4	Execution of activities based on orders received from the wheelhouse Hand signalling during execution of a ship manœuvre Dispatch of messages by means of VHF equipment.
	4. Knowledge of the effects of water movement around ships and local effects on sailing circumstances including the effects of trim, shallow water relating to ship´s draught.	4.1 Supervision of ship mooring works from the bridge. 4.2 Checking of water depth by use of lead line 4.3 Securing hatch covers against adverse weather conditions 4.4 Calculation for determining the required draft	Lead line Service boat Hatch cover safety rope Internal communication system on board the ship Software application for calculation of ship stability	4	Assessment of ability to use the lead line. Accuracy of supervision activity from bridge. Safe closing of hatch covers in real time. Establishment of ship stability conditions under various load conditions.

	5. Knowledge of the effects of water movement and effects around the ship during manoeuvring including the interaction effects when two ships pass and overtake each other in narrow fairways. The interaction effects on a ship moored alongside when another ship is proceeding in the fairway and passing at a short distance.	5.1 Watch keeping ensuring communication to wheelhouse of distances aft – fore and beam 5.2 Communication with port authorities related to traffic conditions in the subject area 5.3 Interpretation of data supplied by AIS	Internal communication systems on board the ship VHF equipment AIS equipment	4	Accuracy of data sent to the wheelhouse Accuracy of data sent to the port authorities Correct interpretation of data supplied by AIS
2. Assist with couple operations of push barge combinations	1. Knowledge and ability to connect and disconnect push/ barge combinations using approved equipment and materials.	1.1 Convoy set up and disentanglement manoeuvre	Winches/capstans Drum ropes Hauling lines Mooring and deck accessories Internal communication equipment on board ” Bow thruster” system	12	Correct and safe hauling of the convoy
	2. Knowledge and ability to apply safe working rules and communication with	2.1 Use of proper labour equipment on manœuvre workstation	Internal communication systems on board the ship	2	Proper equipping for the manoeuvre Preparation of the

	crewmembers involved.	2.2 Preparation of the manœuvre workstation ensuring safe execution of the manœuvre 2.3 Communication with the wheelhouse for start-up of the convoy set up manoeuvre.	Individual labour and protection equipment Individual life saving equipment		manoeuvre workstation in accordance with labour safety regulations Dispatch of information to the wheelhouse in real time
3. Assists with anchoring operations	1. Knowledge of anchoring equipment and procedures in various circumstances.	1.1 Ship anchoring manoeuvre on port roads 1.2 Anchoring manœuvre with two fore anchors	Anchoring system Drum ropes Internal communication systems on board the ship Individual labour and protection equipment Deck accessories Ship mooring accessories ” Bow thruster” system	12	Correct choice of anchoring location. Observance off labour safety regulations during anchoring manoeuvre Correct understanding and confirmation of orders received from wheelhouse

	2. Knowledge and ability to assist with anchor manoeuvres: prepare anchor equipment for anchoring operations, presenting anchor, giving sufficient amount of cable to veer initially. Determination when the anchor holds the ship at its position (anchor bearing). Securing of anchors on the completion of anchoring. The use of dragging anchors in various manoeuvres. Handling of the anchor signs.	2.1 Preparation of the anchoring system for the anchoring manoeuvre 2.2 Definition of a benchmark to prevent tripping of anchor 2.3 Installation of ship visual signals for the anchoring operation	Drum ropes Internal communication systems on board the ship Night time signalling system on board Day time signalling system on board	8	Observance of proper sequence of operations during preparation of the anchoring system Correct choice of the benchmark used to prevent tripping of anchor Correct identification of ship visual signals for the anchoring manoeuvre
4. Steer the ship complying to helm orders using steering gear properly	1. Knowledge and ability to steer the ship under supervision and complying with helm orders using propulsion and steering systems.	1.1 Steering on a given direction 1.2 Reception and confirmation of correct understanding of orders received for correct steering of the ship	Steering system Internal communication systems on board the ship ” Bow thruster” system	2	Correct steering of ship on given direction Understanding and confirmation of orders received for steering of helm

	2. Knowledge of functions and types of the various propulsion and steering systems.	2.1 Reading of the steering system diagram displayed in the mess room	Tables with steering system diagrams	2	Correct reading of the steering system diagram
5. Apply knowledge of influence of wind and current	1. Knowledge of the influence of wind and current on sailing and manoeuvring.	1.1 Reading and interpretation of data supplied by the anemometer 1.2 Correct steering of helm based on data supplied by the helm indicator 1.3 Interpretation of radar display	Steering system Anemometer Helm indicator Radar installation	4	Correct and real time interpretation of data supplied by the anemometer Correct use of data supplied by the helm indicator for proper steering of ship Correct interpretation of images on radar display
	2. Knowledge of the influence of wind on sailing and manoeuvres in waterways with or without current and various wind directions.	2.1 Establishment of wind direction by use of indications supplied by the environment	Wind direction canvas	2	Correct definition of wind direction
6. Apply knowledge of navigational aids, tools and materials.	1. Basic knowledge of the navigation tools such as, rudder indicator.	1.1 Interpretation of data supplied by the helm indicator for ship movement ahead / back	Helm indicator	2	Correct use of data supplied by the helm indicator

	2. Ability to understand and use the information of navigation equipment such as VHF, compass, rate of turn indicator, binocular, sailing speed indicator.	2.1 Dispatch of message using the VHF equipment 2.2 Use of turning speed indicator data during steering of ship 2.3 Interpretation of data supplied by the anemometer	VHF equipment Anemometer Helm indicator Turning speed indicator	2	Use of standard vocabulary during dispatch of message via VHF Correct use of the ship turning speed indicator Correct interpretation of data supplied by the anemometer
	3. Knowledge and ability to use navigation materials such as charts.	3.1 Definition of difficulties of the navigation area by use of Nautical Charts or ECDIS	Nautical charts ECDIS equipment	2	Identification of all navigation difficulties in the relevant navigation sector
7. Undertake actions to be taken in terms of safety of navigation	1. Knowledge and ability to recognise unsafe situations and follow-up actions according to the safety regulations. Immediately warning of the ships management. The use of personal protective and rescue equipment.	1.1 Role play exercises for emergency situations • Water hole • Man overboard • Fire • Abandon	Labour safety equipment Individual and collective life-saving equipment Fire fighting equipment Ship vitality equipment and systems Medical first aid equipment	10	Correct performance in real time of role responsibilities for the specific position

	2. Knowledge of verification commissioned by the supervisor the presence, usefulness, water tightness and securing of the ship and its equipment.	2.1 Plugging a hole in ship's side shell	Ship vitality systems, equipment, devices and materials	6	Use of equipment, materials, tools and devices required to plug the water hole. Correct and real time plugging of the water hole.
	3. Knowledge of and ability to execute the work according to the checklist on deck and living quarters such as water proofing and securing of the hatches and holds.	3.1 Identification of incidents occurred on deck and in the living quarters which may endanger safety of ship, cargo and crew on board	Plan of activities on board approved by ship Boatmaster	2	Identification of incidents occurred on deck and in the living quarterswhich may endanger safety of ship, cargo and crew on board
	4. Knowledge of and ability to execute the work according to the checklist in the engine room; store and secure loose items. Filling the day service tanks, checking vents.	4.1 Inspection of leaks from ship bilge 4.2 Identification of water tightness failures in the engine cooling systems	Activity plan for engine room Engine room specific systems	2	Interpretation of information concerning ship security
8. Describe the network of the main European inland	1. Knowledge of the most important national and international inland waterways.	1.1 Main ports in the national sector of the Danube (subject to voyage)	Navigation Charts	2	Citation of at least three main ports

waterways	2. Assist with planning of the journey, e.g. determination of height of bridges in the canal area.	2.1 Definition of the type of convoy recommended for the Danube navigation sector between Giurgiu and Drobeta Turnu Severin	Navigation documents including information on convoys recommended for various navigation sectors	2	Correct identification of the convoy type for this navigation sector
	3. Knowledge of the main port and terminals located in the European IWT network.	3.1 Voyage planning subject to liquid cargo discharge ports in the navigation sector Brăila - Orșova	Various navigation documents	2	Correct voyage planning subject to sequence of the discharge ports
9. Apply the knowledge of day and night signs, sound signals and general rules of the inland waterway police regulations	1. Handling and maintenance of day and night signs and sound signals.	1.1 Installation of the daytime and night time visual signals for the anchoring manoeuvre	Daytime and night time visual signals on board the ship	2	Use of regulatory signals
10. Describe the various types of locks in relation to locks operation	1. Apply knowledge of the procedures during entering, locking and leaving the lock.	1.1 Supervision of the manoeuvre workstation and communication to the wheelhouse of distances to lock walls on entry to and exit from the lock.	Mooring system ” Bow thruster” system Internal communication systems on board the ship	4	Correct dispatch of distances to the wheelhouse
11. Use systems of traffic control	1. Knowledge of various traffic control systems in use on the waterway of	1.1 Communication with the naval authority in RIS system	RIS Communication equipment	2	Use of communication channels assigned

	sailing.				for the naval traffic
	2. Knowledge and understanding of day and night signs on locks, weirs and bridges. Follow instructions of the competent authority such as, bridge- and lockkeepers and traffic control operators.	2.1 Communication to the wheelhouse of significance of regulatory signals for passage through locks, weirs, under bridges 2.2 Communication with the Port Control operator within the traffic control authority	Internal communication systems on board the ship CEVNI navigation regulation on various navigation channels	2	Correct communication of the passage manner under bridges and through locks in accordance with visual signals Correct use of standard messages for communication with ship traffic control authorities
	3. Knowledge and understanding of VHF procedures to report or request of information with traffic centres and in emergency cases, ability to use the VHF. Basic knowledge of AIS and Inland ECDIS.	3.1 Dispatch to Port Control operators of notification on ship departure from port 3.2 Insertion of specific data concerning voyage of a general cargo ship on the Danube navigation sector between Brăila and Tulcea 3.3 Interpretation of images displayed by ECDIS	VHF equipment AIS equipment ECDIS equipment	4	Use of communication channels assigned and standard messages for communication with Port Control Correct entry of AIS data Correct interpretation of images displayed by ECDIS

4.3.5 Practical exercise scenarios

To support the trainers on board of the Danube school ship, practical exercise scenarios shall be defined for the competences outlined in the chapter/table above. Here is an example for the competence "Ship berthing manoeuvre to port berth":

1. The order "Prepare manoeuvre" is sent from the wheelhouse. The order is sent by the Boatmaster using the fixed communication system on board the ship;
2. Crew members in charge of this manoeuvre reach the workstations properly equipped with safety protection equipments subject to specific weather conditions;
3. Two workstations are set up one at foreside and the other at the aft part of ship;
4. Each manoeuvre team shall have a team head who will keep permanent contact with the wheelhouse;
5. The head of the workstation notifies the wheelhouse via a mobile radio station that the team is ready for the berthing manoeuvre;
6. The head of the workstation notifies to the wheelhouse distances in metres to and abreast the berthing place;
7. Crew members prepare the ship mooring ropes, which had been formerly properly checked in terms of proper condition , suitable lengths and provision of bollard eyes on both ends, without kinks;
8. The mooring rope is entered in the sideshell hawse and the bollard eye is brought over the bollard on the sideshell;
9. The head of the workstation is notified from the wheelhouse that the ship has stopped the engine and is steered to the berthing place ;
10. When getting closer to the berth, the bollard eye of the mooring rope is thrown to the mooring bitt on the berth and the rope is bitted to the bollards on board the ship
11. The mooring rope is bitted by hand, and after it is stopped off several turns are made on the bollards on board the ship ;
12. When making the turns special attention shall be paid so that turns are placed one on top of the other to prevent break of rope under load;
13. Development of cringles shall be avoided when turning the mooring ropes; any such cringles, if occurred, shall be immediately undone to prevent deterioration of rope;
14. Ship shall be first moored with its fore side, after which the aft side shall be also moored following the same operations.
15. The head of the workstation shall notify to the wheelhouse completion of the mooring manoeuvre;
16. Securing of ship to berth by doubling and equalizing the mooring ropes;
17. After having moored and secured the ship to berth, the wheelhouse shall send the order: "Manoeuvre completed" and crewmembers in charge with the mooring manoeuvre are free to leave the workstation.

4.4 Tour

Another important part of this Danube School Ship concept is the tour of such a vessel. It is influenced by several factors, such as:

- the travel time of the vessel,
- the duration of training units on board of the school ship, and
- the estimated number of students per country.

4.4.1 Travel times of the vessel

The following table gives an overview of the travel times from and to main ports in the Rhine/Danube corridor for several types of inland vessels.

Travel Time in Hours				Distance km	Port	Number of locks	Travel Time in Hours			
4-unit pushed convoy	2-unit pushed convoy	MCV 2,000 t	MCV 1,350 t				MCV 1,350 t	MCV 2,000 t	2-unit pushed convoy	4-unit pushed convoy
	174	161	172	1,440	Ghent	62	159	149	165	
	170	157	168	1,419	Antwerp	61	155	145	161	
	163	151	160	1,325	Amsterdam	61	149	140	154	
	163	151	161	1,336	Rotterdam	58	147	138	152	
	145	135	142	1,119	Duisburg	58	135	127	141	
	119	113	113	835	Mainz	58	119	111	125	
	115	109	109	808	Frankfurt	56	116	108	122	
	43	41	41	380	Nuremberg	17	55	47	55	
	26	25	25	280	Kelheim	8	39	31	39	
	23	22	22	242	Regensburg	6	33	26	34	
	14	13	13	153	Deggendorf	4	21	17	21	
				0	LINZ	0				
2	2	2	2	19	Enns	1	3	2	3	3
7	6	6	6	73	Ybbs	3	10	8	10	11
13	10	10	10	133	Krems	4	17	14	17	19
20	17	17	17	211	Vienna	7	27	22	27	30
26	22	22	22	263	Bratislava	7	36	30	37	41
42	37	37	37	491	Budapest	8	60	51	61	70
51	45	45	45	652	Baja	8	75	63	76	88
61	54	54	54	798	Vukovar	8	90	76	91	106
67	60	60	60	878	Novi Sad	8	99	85	100	117
73	65	65	65	961	Belgrade	8	109	93	110	128
98	88	88	88	1,340	Vidin	10	142	120	140	164
115	103	103	103	1,639	Giurgiu	10	167	140	163	191
135	121	121	121	2,007	Réni	10	197	164	192	224
142	128	128	128	2,131	Sulina	10	208	173	201	236
133	120	119	120	1,891	Constanța[1]	12	190	159	185	216
139	125	125	125	2,074	Ismail	10	203	169	197	231
141	127	127	127	2,120	Kilia	10	207	172	200	235

Main Route Rotterdam–Sulina → **Direction**

● Further seaport routes (furcations)

[1] *In case of low water levels via Borcea arm "100 km detour route"*

Table 11: Travel times from/to Linz; Source: Manual on Danube Navigation, viadonau

The distance from Kelheim (Germany) to Sulina (Romania) is approximately 2,400 km. The travel time downstream for a motor cargo vessel with 1,350 t is approximately 150 hours, upstream approx. 250 hours. Considering that the school ship is 320 days in use per year and travels eight hours per day on average, it could navigate approximately 6 times completely up and down the Danube per year.

4.4.2 Duration of training units on board of the school ship

As outlined in the previous chapter of this Danube School Ship concept, the training plan foresees a number of 20 trainees on board of the vessel for trips of 15 days, allowing for 120 hours of practice.

Certainly, not all institutions participating in the operation and usage of the Danube School Ship do have the same requirements concerning the amount of practical training, but it is a plausible estimation in this pre-implementation concept.

4.4.3 Estimated number of users per country

The third influencing factor for the tour of the Danube School Ship is the estimated number of students/trainees per country per year. The following table summarises the results of the requirement analysis carried out in the participating Danube countries.

Country	Estimated # of users per year
Austria	20-25
Slovakia	30 – 40
Hungary	50 – 70
Croatia	45 – 65
Serbia	Approx. 110
Romania	160 - 500
Bulgaria	160 – 260

Table 12: Estimated # of Danube School Ship users per year

Summing the number of users up, the Danube School Ship is relevant for the tuition of at least 580 students/trainees! It is also clearly shown that the number of potential students/trainees increases in the regions farther downstream of the Danube.

4.4.4 Exemplary tour for the Danube School Ship

The education and training concept of the Danube School Ship foresees classes of 20 students/trainees for a period of 15 days to reach all the educational goals. Therefore, the vessel has the capacity for the training of 40 students/trainees a month or 480 students/trainees a year.

The following table shows an **exemplary tour** for the vessel, keeping the needs of the institutions participating in the requirement analysis in mind. The fields marked grey indicate which months would be suitable for the usage of the Danube School Ship in the specific country. The maximum capacity of the vessel is 20 students at a time. The numbers in the table indicate the amount of students per country on board of the vessel for the specific time period.

	January		February		March		April		May		June		July		August		September		October		November		December		
	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	
Austria				7				7											7						21
Slovakia									13										13						26
Hungary				13	5			13	7											10					48
Croatia					15															10	15				40
Serbia							20			20	15	15						20							90
Romania		10	10			20					5	5	20	20	20	10	10				5				135
Bulgaria	20	10	10													10	10					20	20	20	120
	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	480

Table 13: Exemplary tour of the Danube School Ship

Regretfully, the capacity of the vessel is smaller than the need of the target group. Approaches for the solution of this problem have to be elaborated within an implementation concept in the framework of an implementation project.

4.5 Estimated costs

There are several kinds of costs that have to be considered in the cost estimation.

- Acquisition costs are costs incurred for the purchase of the Danube School Ship.
- Standby costs are costs incurred for maintaining a vessel ready for use, such as crew costs, amortisation and insurance, not taking into account operating costs.
- Operating costs are costs incurred depending on the travelled distances and the time, such as fuel and lubricants costs, inland waterway transport dues, port dues, maintenance and repair costs, regular technical revision, etc.

4.5.1 Acquisition/ construction costs

In the concept design phase, the determination of construction costs can be based on the estimation and proportion of main cost components. The main cost components are:

- Steel structure
- Machinery
- Pipe systems and pumps
- Electrical systems
- Furnishing
- Other equipment

This study estimates the cost of steel structures according to a steel structure weight calculation. The other cost components are determined by the specific cost proportion of passenger vessels.

Price of steel structure

Based on the main section concept of a typical double bottom passenger vessel and taking consideration the main dimensions of the Danube School Ship the weight of steel structure can be estimated.

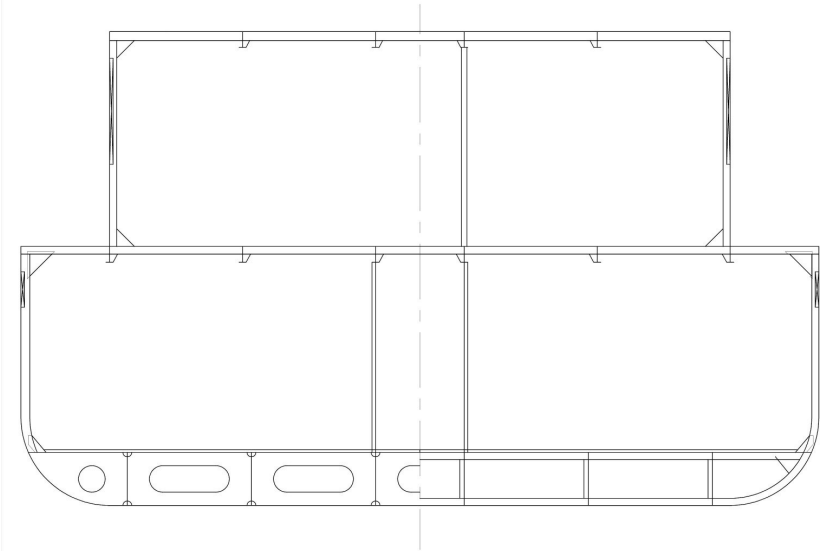

Figure 17: Main section concept of Danube School Ship

The actual average price of inland ship steel structure is between 2.4 - 3.4 EUR/kg in Europe. The steel structure cost is obtained by multiplying the structure weight and steel structure price.

Danube School Ship version	Weight of steel structure	Steel structure cost
54.5m long ship with fixed wheelhouse	264 tons	633 600 EUR - 897 600 EUR
58m long ship with lifting wheelhouse	281 tons	674 400 EUR - 955 200 EUR

Table 14: Danube School Ship costs of steel structure

Proportion of main cost components

The proportion of cost components depends on hull shape, ship size hull and function.

The cost rate of machinery is usually in range of 15% - 40% depending on power of engines, fuel type, speciality of propulsion, etc. The Danube School Ship has a commercial propulsion, using normal diesel fuel. The power of main and auxiliary engines is a bit higher than the usual power of this vessel size, but it is in the regular power range. Based on this consideration the rate of machinery cost is chosen at 20%.

The cost rate of pipe systems and pumps is usually in range of 10% - 20% depending on the length of pipes, number of systems, special requirements (like dangerous good ships), pump power, etc. The Danube School Ship does not need special pipe systems, but the regulations of passenger vessels have to be followed. That is why the rate of pipe system and pump cost is chosen at 15%.

The cost rate of electrical system is usually in range of 10% - 20% depending on number of electrical systems, required electric power, diesel-electric propulsion, etc. The Danube School Ship has the usual electrical system, it does not have any speciality like diesel-electric propulsion. But it has some additional electric energy consumer function (kitchen, high performance air conditioner, etc.). Taking these arguments into account, the 15% rate of electrical system cost is chosen.

The cost rate of furnishing is usually in range of 5% - 15% depending on the number of crew/passengers, size and functions of rooms, quality of furnishing, etc. The Danube School Ship does not require high quality interior design or furnishing like a hotel vessel, but the living area is higher than a similar size cargo vessel. Based on this consideration the rate of furnishing cost is chosen at 10%

The cost rate of the other equipment is usually between 5% - 10% depending on type and functions of ship, quality of equipment, etc. The Danube School Ship is a passenger vessel and a pusher as well. Because of these functions, all required equipment of a pusher and a passenger vessel has to be mounted. The quality of tools should be good to serve the high quality education. That is why the rate of other equipment cost is chosen at 10%.

The cost rate of steel structure is usually in range of 30% - 45% depending on the size of ship, difficulty of hull shape, propeller tunnels, functions of vessel, etc. Summarizing the other cost component rates, the steel structure cost is 30%. This is the lower limit of the usually range, but acceptable because the Danube School Ship has a relatively simple hull form. Although it has two propeller tunnel at stern, but propeller nozzle is not required. It is a special passenger vessel with serious pipe and electrical systems.

Based on the estimation of steel structure costs and proportion of main cost components, the construction costs of the Danube School Ship can be calculated (see the following table).

Main cost components	Rate of cost component	54.5m long ship with fixed wheelhouse	58m long ship with lifting wheelhouse
Steel structure	30%	633 600 EUR - 897 600 EUR	674 400 EUR - 955 200 EUR
Machinery	20%	422 400 EUR - 598 400 EUR	449 600 EUR - 636 800 EUR
Pipe system and pumps	15%	316 800 EUR - 448 800 EUR	337 200 EUR - 477 600 EUR
Electrical system	15%	316 800 EUR - 448 800 EUR	337 200 EUR - 477 600 EUR
Furnishing	10%	211 200 EUR - 299 200 EUR	224 800 EUR - 318 400 EUR
Other equipment	10%	211 200 EUR - 299 200 EUR	224 800 EUR - 318 400 EUR
Total	**100%**	**2.112 - 2.992 million EUR**	**2.248 - 3.184 million EUR**

Table 15: Danube School Ship costs for new/special construction

The estimated total **acquisition costs for the new school ship** are between approx. 2.1 and 3 million Euro for a vessel with fixed wheelhouse and approx. 2.2 and 3.2 million Euros for a vessel with lifting wheelhouse.

4.5.2 Standby costs

The standby costs consist of several cost factors.

The biggest one is the costs for the **crew**. From this point of view, the Danube school ship will be staffed with two boatmasters, two boatmen and one machinist. It would be favourable, if one of the crew members is also a cook. Otherwise an additional crew member is necessary. At least four crew members have to be on board to operate the vessel in operation mode A1 without a barge, which will be the main operation mode for the Danube School Ship (see chapter 4.1). If more than one person is missing, due to e.g. holidays or illness, the teachers of the training institutions, which are very often boatmasters themselves, have to help out.
The costs for **repairs** shall be limited, as the vessel is a new construction. The **insurance** costs are determined by the value of the vessel, drive power and the number of students/passengers.
The estimated costs for **miscellaneous** include costs e.g. like port fees, food, electricity, water, kitchen, external security services, telephone, travel costs for crew, learning materials.

The **amortisation/depreciation** has been calculated considering a useful life expectancy of 20 years. The basis for the calculation of the interest amount is an interest rate of 5% and a credit amount of approximately 50% of the acquisition costs (€ 1,500,000).

The following table summarises the estimations for the standby costs per year.

Costs in €/ year	
Crew	€ 350,000
Repairs	€ 30,000
Insurance	€ 25,000
Miscellaneous	€ 100,000
Amortisation/Depreciation	€ 150,000
Interest	€ 75,000
Total Costs	**€ 730,000**

Table 16: Standby costs of the Danube School Ship

4.5.3 Operating costs

The navigation on international waterways, such as the Danube, is no subject to inland waterway dues. The school ship will only exceptionally sail a Channel (Rhine-Main-Danube or Cernovoda) where dues are charged. Therefore, the operating costs of the Danube School Ship are **fuel and lubricant costs** only.

The fuel costs are based on the fuel consumption. The concept design cannot determine the exact fuel consumption without knowing types and operational profile of the different engines, but an estimated value is calculated. Furthermore, the following calculations of the hourly fuel consumption consider the operation of the Danube School Ship together with 2 full loaded DE IIb barges (approx. 1,500 tons each). The calculation results are therefore maximum values per hour!

There are three major fuel consumers on board:

- Main engines
- Auxiliary engines
- Boiler

Main engines

The fuel consumption calculation of the main engines is based on the technical data of Caterpillar C9 ACERT engine. The 375kW rated power of this engine fits to the main engine need of the Danube School Ship. Although the fuel consumption is about 99l/h by 100% charging, this fact cannot be the basis of fuel consumption calculation, because the ship does not use always the full powered propulsion. Without knowing the load profile of engines, the fuel consumption estimation use the E3 test cycle according to ISO 8178-4 standard (Reciprocating Internal Combustion Engines - Exhaust Emission Measurement, Part4: Steady - state test cycles for different engine applications). However, this standard defines the loading conditions and its weight for determining emission, the operation profile of engines can be approximated as sum of loading conditions multiplied by weighting factor.

Speed of engine	100%	91%	80%	63%
Power of engine	100%	75%	50%	25%
Weighting factor	0.2	0.5	0.15	0.15

Table 17: E3 test cycle type for propeller-law heavy duty ship propulsion engines acc. to ISO 8178-4

The specific fuel consumption of Caterpillar C9 ACERT engine is given in brochures as follows.

Power	100% - 375 kW	75% - 281.3 kW	50% - 187.5 kW	25% - 93.8 kW
Specific fuel consumption	221.7 g/kWh	213.1 g/kWh	215.4 g/kWh	229.4 g/kWh
Fuel consumption (840 kg/m^3 fuel)	83.1 kg/h 99 l/h	60 kg/h 71.5 l/h	40.4 kg/h 48.1 l/h	21.5 kg/h 25.6 l/h

Table 18: Fuel consumption of Caterpillar C9 ACERT engine

Based on engine data and ISO 8178-4 E3 test cycle, the estimated hourly fuel consumption of the Danube School Ship is about 134 litre gasoline. Considering 0.66 EUR/litre fuel price, one operating hour of the Danube School Ship convoy costs 88.40 EUR with regard to the fuel.

Auxiliary engines

The fuel consumption calculation of auxiliary engines is based on the technical data of Volvo Penta D9 MG genset, which has 239kW rated power. Although the Danube School Ship would be equipped with two gensets, in regular operation one auiliary engine is enough to fulfil the electric energy need of the vessel. Without knowing the load profile of genset, the fuel consumption estimation use the D2 test cycle according to ISO 8178-4 standard, like by main engines.

Genset : Cycle type D2

Speed of engine	Rated speed (1500 RPM)				
Torque of engine	100%	75%	50%	25%	10%
Weighting factor	0.05	0.25	0.3	0.3	0.1

Table 19: D2 test cycle type for generating sets on board of ships acc. to ISO 8178-4

The specific fuel consumption of Volvo Penta D9 MG genset is given in brochures as follows.

Power	100% 239 kW	75% 179.3 kW	50% 119.5 kW	25% 59.8 kW	10% 23.9 kW
Specific fuel consumption	204 g/kWh	205 g/kWh	213 g/kWh	222 g/kWh	235 g/kWh
Fuel consumption 840 kg/m^3 fuel	48.8 kg/h 58.1 l/h	36.8 kg/h 43.8 l/h	25.5 kg/h 30.4 l/h	13.3 kg/h 15.8 l/h	5.6 kg/h 6.7 l/h

Table 20: Fuel consumption of Volvo Penta D9 MG genset

Based on engine data and ISO 8178-4 E3 test cycle, the estimated hourly fuel consumption of Danube School Ship is about 28.4 litre gasoline. Considering 0.66 EUR/litre fuel price, one operating hour of the auxiliary engines costs 18.75 EUR with regard to the fuel.
It has to be considered that the auxiliary engines are not running when the ship receives the electricity from shore.

Boiler

The fuel consumption calculation of boiler is based on the technical data of Viessmann Vitoradial 300 boiler, which has 201kW combustion output. The estimated daily average combustion output is 8kW, taking into consideration that in wintertime about 15% and in summertime about 1% of max output is the average in a day.

Based on the brochure of boiler the estimated hourly fuel consumption of Danube School Ship is about 14 litre gasoline. Considering 0.66 EUR/litre fuel price, one operating hour of the boiler costs 9.24 EUR with regard to the fuel.

4.5.4 Conclusions

The expected standby costs per year come up to 730,000 EUR.

The fuel consumption is very hard to estimate, as it strongly depends on the operation mode (operating hours), the tour and the actual distances navigated, the actual prices of fuel and the weight of the vessel/convoy. From this point of view, an estimation of 200,000 EUR fuel costs per year seems reasonable.

Therefore, the yearly costs come up to approx. 930,000 EUR.
Considering that the vessel will be used for the tuition 480 students per year (20 at the same time) for a period of 15 days, **the training of one student costs € 1.938 for 15 days or approx. € 130 per day**.

4.6 Funding options

This chapter describes, which potential funding opportunities and instruments exist in the time period from 2014 till 2020 for the design and development of a Danube School Ship, for being later used on a transnational basis between all Danube-riparian countries from Germany till Ukraine.

It is important to note that currently (spring 2014) most European programmes have either not been finalised or started yet with the exception of the Horizon 2020 programme.

4.6.1 Prerequisites

When acquiring and operating a Danube School Ship you have to differ basically between acquisition and/ or retrofitting costs for the development phase. Once developed, you have to consider running operation and maintenance costs.

First, the acquisition of a new Danube School Ship or the retrofitting of an existing will be more than a raw vessel hull and its engine. At the final stage it includes also all necessary education and training equipment being used on board. According to previous carried out benchmarking and vessel concept work the acquisition costs of a new Danube School Ship would be approx. 3 Mio EUR.

Second, during the operation of the Danube School Ship you will have operation and maintenance costs which have to considered, whereas both vessel-related costs (i.e. fuel costs, maintenance costs, repair costs etc.), human-related costs (i.e. personnel costs of staff on board), and infrastructure- related costs (i.e. harbour dues) will appear and have to be paid on a regularly basis.

Moreover, you have to consider that the transnational approach and usage of the Danube School Ship will have effects on the acquisition and operation phase of this future vessel as well as on the identification and selection of suitable EU funding programmes and instruments herefore.

4.6.2 Potential funding programmes and instruments

Following potential funding programmes and financial instruments will be identified, described and validated with regard to their affinity for realising either the acquisition of a new Danube School Ship or its running costs.

This survey addresses primarily funding instruments available on European level than on national ones, as the future Danube School Ship holds a transnational (Danube-wide) character and demands therefore also transnational funding schemes.

Following potential funding instruments have been identified being accessible between 2014 and 2020 and having eventually affinity for the realisation of a future Danube School Ship (DSS).

#	**Possible funding programmes and instruments** (selected examples)	**Details**
1.	Horizon 2020 (FP7)	http://ec.europa.eu/programmes/horizon2020/
2.	CEF (TEN-T)	http://ec.europa.eu/transport/themes/infrastructure/index_en.htm
3.	Marco Polo (follow up)	http://ec.europa.eu/transport/marcopolo/
4.	ETC local	e.g. ETC AT-DE/CZ/SK/HU, ETC RO/BG etc. etc.
5.	ETC transnational	e.g. Danube Programme (SEE) etc.
6.	ETC interregional	e.g. INTERREG EUROPE etc.
7.	Operational Programme Transport (SOPT) (example: Romania)	http://ec.europa.eu/regional_policy
8.	European Social Funds (ESF)	http://ec.europa.eu/regional_policy/thefunds/social/index_en.cfm
9.	Lifelong Learning programme (LLL)	http://eacea.ec.europa.eu/llp/about_llp/about_llp_en.php

Table 21: Possible funding programmes and instruments (selected examples)

Horizon 2020 (FP7)

Horizon 2020 is the biggest EU research and innovation programme ever. Almost €80 billion of funding is available over seven years (2014 to 2020) – in addition to the private and national public investment that this money will attract. Horizon 2020 will help to achieve smart, sustainable and inclusive economic growth. The goal is to ensure Europe produces world-class science and technology, removes barriers to innovation and makes it easier for the public and private sectors to work together in delivering solutions to big challenges facing our society.

The Horizon 2020 programme sections are:

- Excellent Science
- Industrial Leadership
- Societal Challenges
- European Institute of Innovation and Technology
- Euratom

The H2020 section “Excellent Science” covers several sub-topics. One of these is named “Marie Skłodowska-Curie actions (MSCA)”. The objective of the MSCA is to support the career development and training of researchers – with a focus on innovation skills – in all scientific disciplines through worldwide and cross-sector mobility. For this, the MSCA provide grants at all stages of researchers’ careers, from PhD

candidates to highly experienced researchers, and encourage transnational, intersectoral and interdisciplinary mobility. The MSCA will become the main EU programme for doctoral training, funding 25.000 PhDs.

HINT: It is important to note that this funding opportunity might be used for future collaboration among interested stakeholders from the academic sector (i.e. universities,…) and to make use of this funding programme for research exchanges and similar actions.

The H2020 section "Industrial Leadership" covers several sub-topics. One of these is named "Access to risk finance". Under the 'Industrial Leadership' pillar, this section will help companies and other types of organization engaged in research and innovation (R&I) to gain easier access, via financial instruments, to loans, guarantees, counter-guarantees and hybrid, mezzanine and equity finance.

HINT: It is important to note that this funding opportunity addresses primarily commercial enterprises for stimulating their business innovations and to ease the market penetration of their innovated products.

The H2020 section "Societal Challenges" covers several sub-topics. One of these is named "Smart, Green and Integrated Transport". This challenge aims to boost the competitiveness of the European transport industries and achieve a European transport system that is resource-efficient, climate-and-environmentally-friendly, safe and seamless for the benefit of all citizens, the economy and society. In its Work Programme following activities will be promoted and tendered:

- Mobility for Growth
- Green Vehicles
- Small Business and Fast Track Innovation for Transport

HINT: It is important to note that not all DSS activities might fit into this EU programme. While research and technical development actions (here: vessel design) fit perfectly with this funding programme, however, the real construction and development work of a DSS not.

CEF (TEN-T)

As of January 2014, the European Union has a new transport infrastructure policy that connects the continent between East and West, North and South. This policy aims to close the gaps between Member States' transport networks, remove bottlenecks that still hamper the smooth functioning of the internal market and overcome technical barriers such as incompatible standards for railway traffic. It promotes and strengthens seamless transport chains for passenger and freight, while keeping up with future technological trends. This will help the economy in its recovery and growth, with a budget of €26 billion up to 2020.

The infrastructure development of the trans-European transport network is closely linked with the implementation and further advancement of EU transport policy. When, in the past, TEN-T policy was merely perceived as a funding instrument for major projects, it has now grown into a genuine policy which:

- Reinforces the network approach, thereby establishing a coherent basis for the identification of projects and for service provision in line with relevant European objectives

- Sets standards for all the network – existing and planned parts – which integrate EU legislation in force and lead the way infrastructure-wise to achieving key policy objectives. Existing standards include, in particular, those set in the fields of railway policy, transport telematics or safety. New policy approaches are enabled in fields such as clean power for transport and other innovative areas, the link between TEN-T and urban mobility or sustainable and high-quality services for freight and passengers.
- Highlights the importance of nodes as an integral part of the network: maritime ports and airports as Europe's gateways, inland ports and rail road terminals as key infrastructure for inter-modal transport chains as well as urban nodes as the origin and destination of the majority of journeys on the trans-European transport network.
- Notably through the new core network corridor approach, advances sustainable transport solutions which lead the process towards the achievement of the European Union's long-term transport policy objectives (meeting future mobility needs while ensuring resource efficiency and reducing carbon emissions).

Are there new funds in 2014-2020? A new facility will be created called the "Connecting Europe Facility" (CEF). It aims to accelerate the development of priority infrastructure that the EU needs in transport, energy and information technologies. €10 billion of the Cohesion Fund will be ring-fenced for this facility which will be managed directly by the Commission. The Cohesion Fund will continue to support transport infrastructure in Member States with a GNI below 90% of the EU average.

HINT: It is important to note that this European funding programme is primarily dedicated to the European transport network and its infrastructures, but does not support the financing of inland vessels related to education and training.

Marco Polo (follow up)

Between 2003 and 2013 Marco Polo aimed to ease road congestion and its attendant pollution by promoting a switch to greener transport modes for European freight traffic. Railways, sea-routes and inland waterways have spare capacity. Companies with viable projects to shift freight from roads to greener modes can turn to Marco Polo for financial support. More than 500 companies have already done so successfully since the programme was launched in 2003.

Five types of projects which shift freight from Europe's congested roads onto rail, short-sea shipping routes and inland waterways, or which avoid road transport, were eligible for Marco Polo grants. The main category concerns direct modal-shift projects (switching to another mode of transport such as rail or sea). The other four include catalyst actions which promote modal shift, motorways of the sea actions between major ports, traffic avoidance actions which reduce transport volumes, and common learning actions.

HINT: It is important to note that this funding instrument supported until 2013 the modal shift from road to more sustainable modes of transport, but offered also the possibility for small-scale studies and even the development of training related outcomes. If this EU programme will continue from 2014 onwards it might be used for the specification of training standards and procedures on European training vessels, but not usable for the development of an inland vessel itself.

ETC local and cross-border

The European Territorial Cooperation (ETC) is one objective of the Cohesion policy that provides a framework for implementing joint actions and for exchanging experience among different national, regional and local actors. Within this objective three programme types have been differentiated: cross-border, transnational and interregional cooperation through which the EU's territorial integration and cohesion are to be advanced.

The European Territorial Cooperation financed by the European Regional Development Fund remains a separate objective of cohesion policy after 2013, as well. However, it is regulated by a separate act due to specialities of programmes. European Territorial Cooperation Programmes can be divided into three categories:

1) cross-border cooperation- funding for projects involving regions and local authorities on either side of a common border, such as projects that aim to develop the cross-border use of infrastructure;
2) transnational cooperation- funding for projects between national, regional and local entities in larger geographical areas;
3) interregional cooperation- to foster sharing of good practice on innovation, energy efficiency, urban development and other themes;

New elements of the regulation are the thematic concentration, close relation with EU2020 Strategy, increased result-orientation of investments and the territorial approach. Provisions on thematic concentration and investment priorities improve the strategic focus of programmes. According to the proposed regulation, in case of the cross-border and transnational co-operations minimum 80% of EU funds have to be spent on 4 thematic objectives.

According to the current state of ongoing negotiations on 2014-2020 budget, resources for the ETC goal shall amount to 2.75 % of the global resources available from the cohesion Funds, which means 8.9 billion euros. It shall be allocated as follows: 74,06% for CBC programmes, 20,36% for transnational and 5,58% for interregional cooperation.

By focussing on the most local level, the cross-border cooperation, projects can be realised, which will suggested and implemented by a very limited geographical local region, characterised normally of being a border region.

Cross-border cooperation (Example for Hungary):

- Hungary-Slovakia Cross-border cooperation
- Hungary-Romania Cross-border cooperation
- Hungary-Croatia Cross-border cooperation
- Hungary-Serbia Cross-border cooperation
- Hungary-Slovakia-Romania-Ukraine ENI cooperation
- Austria-Hungary Cross-border cooperation
- Slovenia-Hungary Cross-border cooperation

Best practice (Construction project):

During the ETC Slovak Republic – Austria (SK-AT) 2007 – 2013 programme period the EU project "CYCLOMOST II" has improved the transport connections between Austria and Slovak Republic by constructing a passenger bridge across the border river Morava between Devínska Nová Ves (SK) and Schlosshof (AT). Today (May 2014) it is not clear yet, whether also the construction of this river bridge will be also co-financed through this EU funding programme.

This example demonstrates that a construction of a future Danube School Ship, co-financed through this kind of EU programme, is basically possible.

HINT: It is important to note that basically these types of EU programmes (ETC cross-border programmes) could co-finance also the construction of a future Danube School Ship (DSS), if also in advance so well prepared such as this identified best-practice project example. However, if possible, such kind of project should be realised in a Danube region, where a higher number of future stakeholders and users will benefit from a DSS training vessel. For instance, the Danube region of Romania & Bulgaria would fit best to realise a DSS construction-related ETC RO-BG project until 2020.

ETC transnational (i.e. Danube programme, Central Europe programme)

According to the proposal, the European Commission has proposed that the present area of the South East Europe Programme Transnational Cooperation Programme will be covered in the next programming period 2014-2020 by two transnational programmes: Danube and South East Gateway (renamed later on Adriatic-Ionian). These two new programmes will support the development and implementation of two Macro Regional Strategies: Danube and Adriatic-Ionian regions.

The Danube Programme will cover parts of 9 EU countries (Austria; Bulgaria; Croatia; Czech Republic; Germany (Baden-Württemberg and Bavaria) not whole territory; Hungary; Romania; Slovakia; Slovenia) and 5 non-EU countries (Bosnia and Herzegovina; the Republic of Moldova; Montenegro; Serbia; Ukraine (not whole territory), having the same geographical scope than the EU Strategy for the Danube Region.

Thematic priorities of the Danube programme will be defined in line with the relevant draft EC legislation, the national priorities of Partner States, and reflect the needs of the programme area. Topics to be addressed by programme priorities may include many of traditional transnational cooperation topics, like innovation, transport, environment, etc.

Other transnational programmes for the Danube regions would be available since 2014 (e.g. Central Europe programme), but will not be further elaborated here, as comparable with the future Danube programme.

HINT: It is important to note that the future Danube programme will definitely foster the collaboration among transnational regions and stakeholders, such as business and administrations working in the inland navigation sector, and will surely promote the development of innovative concepts including small-scale testing, but will be restricted in case of large-scale investments such as the vessel building necessary for a future Danube School Ship. Concluding it can be summarized that the future Danube programme could pave the way for the design phase of the future Danube School Ship and/ or accompany the construction phase by contributing transnational approaches and concepts about training, operation etc.

ETC international (i.e. INTERREG EUROPE)

INTERREG IVC provided between 2007 and 2013 funding for interregional cooperation across Europe. It was implemented under the European Community's territorial co-operation objective and financed through the European Regional Development Fund (ERDF). The overall objective of the INTERREG IVC Programme was to improve the effectiveness of regional policies and instruments. A project builds on the exchange of experiences among partners who were ideally responsible for the development of their local and regional policies.

It can be estimated that the future INTERREG EUROPE programme will follow the same basic principles between 2014 and 2020 as the INTERREG IVC did.

HINT: It is important to note that the future INTERREG EUROPE programme won´t offer funding opportunities for neither vessel design nor vessel construction, but could offer international partnerships and collaboration beyond transnational regions and their geographical limits.

Operational Programme Transport (SOPT) (example: Romania)

The Operational Programme is a European programme under the Convergence objective co-funded by European Regional Development Fund (ERDF) and the Cohesion Fund (CF). There are Operational Programmes (OPs) available for several topics, such as OP Transport (= SOPT), Education etc. OPs are available in several European countries, such as for example Romania.

The European Commission approved the European Regional Development Fund (ERDF) and Cohesion Fund (CF) Operational programme for Romania for the period 2007-2013, entitled “Operational Programme Transport” (SOPT). The total budget of the programme was around EUR 5.7 billion and the Community assistance amounts to EUR 4.56 billion (approximately 23 % of the total EU money invested in Romania under Cohesion policy 2007-2013).

The main objective of the transport sector is to provide an adequately developed, modern and sustainable infrastructure, appropriately maintained, facilitating the safe and efficient movement of persons and goods nationally and within Europe and contributing positively and significantly to the economic development of Romania. The country needs connections with the other European countries. In addition, high transport costs arise due to lack of proper infrastructure and/or infrastructure in poor condition within the Romanian territory. This programme aims at reducing travel times and thus the costs to access isolated areas within Romania and at ensuring proper connections to the rest of Europe through the main Trans-European Networks axes (TEN-T).

In order to achieve the objective of the SOPT it is proposed to allocate the relevant EU and State funds for transport towards the implementation of the following priority axes:

http://ec.europa.eu/regional_policy/country/prordn/details_new.cfm?gv_PAY=RO&gv_reg=ALL&gv_PGM=1291&LAN=7&gv_per=2&gv_defL=7

Priority axis 1: Modernization and development of TEN-T priority axes aiming at sustainable transport system integrated with EU transport networks

- This priority axis aims at enhancing the territorial cohesion between Romania and the EU member states, by significantly reducing travel times with improved safety and quality of service to principal destinations, domestically as well as Europe-wide, for both passengers and freight, along the TEN-T priority axes 7, 18 and 22.
- The objective will be achieved through the development and upgrading of motorways and railway, and water transport infrastructure, with a view to improving the quality, efficiency and speed of transport services, door-to-door, and increasing volumes of freight and passenger traffic from eastern to western Romania.

Priority axis 2: Modernization and development of the national transport infrastructure outside the TEN-T priority axes aiming at sustainable national transport system

- This priority axis aims at modernizing and developing road, rail, water transport and air transport infrastructure located on the national network outside the TEN-T priority axes and promotes appropriate balance among modes of transport.
- Its objective is to increase passenger and freight traffic with higher degree of safety, speed and quality of service including rail inter-operability; in light of the cohesion policy's objective of developing secondary network connections.

Priority axis 3: Modernization of transport sector aiming at higher degree of environmental protection, human health and passenger safety

- This priority axis aims at implementing the principles of sustainable development of the transport sector in Romania, as per the Cardiff conclusions of the European Council (1998) and the European Strategy for Sustainable Development (Gothenburg 2001). It will promote increased levels of safety, minimize adverse effects on the environment as well as promote inter-modal and combined transport.

For the period 2014 to 2020 Romania is preparing following future Operational Programmes, whereas the OPs on "large infrastructures" and "human capital" would fit best with the ideas and objectives of a future Danube School Ship and its construction and its afterwards usage.

Programul	**Alocarea financiară indicative pentru perioada 2014-2020**
Programul Operaţional Infrastructură Mare	9.5 mld. Euro
Programul Operaţional Regional	6.7 mld. Euro
Programul Operaţional Capital Uman	4.2 mld. Euro
Programul Operaţional Competitivitate	1.2 mld. Euro
Programul Operaţional Capacitate Administrativă	0.55 mld. Euro
Programul Operaţional Asistență Tehnică	0.21 mld. Euro
Programele de cooperare transfrontalieră	0.45 mld. Euro
Alocările financiare indicative la nivelul programelor operaţionale pentru perioada 2014-2020: http://www.fonduri-ue.ro/comunicare/stiri/2447-propunerea-oficiala-de-acord-de-parteneriat-2014-2020	

Romania 2014-2020 – List of operational programmes financed from Structural and Investment Funds

http://insideurope.eu/node/392

Excursion: Cohesion Fund (CF)

Since the EU has defined new long-term objectives for growth and jobs ("Europe 2020 strategy"), there is a need to align the policy better to these goals for achieving the agreed targets on employment, education, poverty, innovation, research & development (R&D) and climate (renewable energy, energy-efficiency and greenhouse gas emissions). This implies tackling the impact of the global economic crisis, unemployment and poverty, climate change, and other challenges that affect all EU regions. Given their share of the EU budget (more than one-third), cohesion policy instruments are key in boosting Europe's economic competitiveness, fostering social cohesion, and creating more and better jobs.

Are there new funds in 2014-2020? Cohesion policy's investment will be channeled through the same three funds: the European Regional Development Fund (ERDF), the European Social Fund (ESF) and the Cohesion Fund. Apart from these three funds, the Commission is proposing to maintain and strengthen the European Globalisation Adjustment Fund. A new facility will be created called the "Connecting Europe Facility" (CEF). It aims to accelerate the development of priority infrastructure that the EU needs in transport, energy and information technologies. €10 billion of the Cohesion Fund will be ring-fenced for this facility which will be managed directly by the Commission. The Cohesion Fund will continue to support transport infrastructure in Member States with a GNI below 90% of the EU average.

The new Cohesion Policy means regions and Member States must target EU investments on four key areas for economic growth and job creation:

- Research and Innovation
- Information and Communication Technologies (ICT)
- Enhancing the competitiveness of small and medium-sized enterprises (SMEs)
- Supporting the shift towards a low-carbon economy

HINT: It is important to note that this European fund and its funding instruments for "large infrastructure" and "human resource" fit perfect with the ideas of the future Danube School Ship (DSS).

For example, the Danube country Romania, where the demand for a future DSS is most probably higher than in other Danube countries, could take further actions to make these funds accessible for the

construction work of a future DSS. If well prepared, this European fund and its funding instruments could help to realize the construction phase of a future DSS unitl 2020.

European Social Fund 2014–2020

The ESF is one of the five European Structural and Investment Funds (ESIF). From 2014 on, these operate under a common framework and pursue complementary policy objectives. They are the main source of investment at EU level to help Member States to restore and increase growth and ensure a job rich recovery while ensuring sustainable development, in line with the Europe 2020 objectives.

Which objectives for the ESF in 2014-2020?

- Getting people into jobs: the ESF will support organisations around the EU to put in place projects aimed at training people and helping them get work. Initiatives supporting entrepreneurs with start-up funding and companies who need to cope with restructuring or a lack of qualified workers will also be funded. Helping young people enter the labour market will be a top priority for the ESF in all EU countries.
- Social inclusion: employment is the most effective way of giving people independence, financial security and a sense of belonging. The ESF will continue to finance many thousands of projects that help people in difficulty and those from disadvantaged groups to get skills and jobs and have the same opportunities as others do.
- Better education: Across the EU the ESF is financing initiatives to improve education and training and ensure young people complete their education and get the skills that make them more competitive on the job market. Reducing school drop-out is a priority here, along with improving vocational and tertiary education opportunities.
- Stronger public administration: The ESF will support Member States' efforts to improve the quality of public administration and governance and so support their structural reforms by giving them the necessary administrative and institutional capacities.

The ESF objectives for 2014-2020 "Getting people into jobs" and "Better education" correspond excellent with the objectives and ideas of a future Danube School Ship, as this concept also wants to stimulate education and training for future working staff in the European inland waterway sector and foster life-long-learning by offering training facilities on board of vessels.

European Social Fund 2014 – 2020:

- The European Social Fund will also support measures to reinforce the education and training systems necessary for adapting the skills and qualifications of the labor force to work in sectors related to energy and environment.
- The European Social Fund has enabled people to use ICT better, to match more effectively people's skills to employers' needs, and particularly to ensure that older workers have appropriate ICT skills.

HINT: It is important to note that this European fund and its related financing instruments holds significant potentials for promoting employment and supporting labour mobility as well as investing in education, skills and lifelong learning, what means perfectly the objectives of a future Danube School Ship. Not yet clarified is onto which degree the ESF instruments might support this particular project initiative: From the development of (national/ international) training concepts via design phase of a future training vessel until the construction phase of Danube School Ship?

Lifelong Learning programme (LLL)

As the flagship European Funding programme in the field of education and training, the Lifelong Learning Programme (LLP) enables individuals at all stages of their lives to pursue stimulating learning opportunities across Europe. It is an umbrella programme integrating various educational and training initiatives. LLP is divided in four sectorial sub programmes and four so called 'transversal' programmes.

The sectorial sub programmes focus on different stages of education and training and continuing previous programmes:

- Comenius for schools
- Erasmus for higher education
- Leonardo da Vinci for vocational education and training
- Grundtvig for adult education

HINT: It is important to note that without any doubt these European programmes can support, if extended also from 2014 till 2020, also the ideas and working activities (i.e. training programmes, training exchange etc.) of a future Danube School Ship; but this most likely not for the construction.

4.6.3 Summary of possible funding opportunities

#	Possible funding opportunities for a future Danube School Ship (selected examples)	Evaluation and recommendations regarding future "Danube School Ship" (DSS)
1.	Horizon 2020 (FP7)	Not accessible for vessel construction, as focus is given on research and innovation issues than infrastructure. Maybe usable for the design phase of the DSS as well as exchange actions.
2.	CEF (TEN-T) 2014–2020	Not accessible for vessel construction, as focus is given on traffic infrastructure (i.e. rivers, ports, but also RIS).
3.	Marco Polo (follow up)	Not accessible for vessel construction, as focus is given on modal shift actions than infrastructure, construction etc.
4.	ETC local 2014–2020	Accessible for the construction of Danube School Ship, if in advanced prepared in a good quality, as seen by other already co-financed EU projects. Such kind of project should be realised, where most stakeholders and future users will be attracted, such as in the Danube regions Romania & Bulgaria.
5.	ETC transnational 2014–2020	Not accessible for the construction work, but important for accompanying transnational support work (training concepts, small-scale pilots,…).
6.	ETC interregional 2014–2020	Not accessible for the construction work, but eventually usable for international partnerships and collaboration across EU.
7.	Operational Programme Transport (SOPT) 2014-2020 (example: Romania)	Accessible for the implementation, meaning construction phase, of a future Danube School Ship, if well prepared and related to the key priorities of the future SOPT in Romania.
8.	European Social Fund 2014–2020	Accessible for the project actions related to the promotion of employment and support of labour mobility meeting therefore the objectives of a future DSS perfectly. Not yet solved and answered is the question up to which degree the ESF might contribute hereto; from concept via design via construction work?
9.	Lifelong Learning programme (LLL)	Accessible for the project actions related to education and synergetic subjects (exchange programmes etc.), but most probably not usable for the construction work of a future DSS.

Table 22: Possible funding opportunities for a future Danube School Ship (selected examples)

5. VALIDATION

5.1 Approach

5.2 Validation feedback Austria

5.3 Validation feedback Slovakia

5.4 Validation feedback Hungary

5.5 Validation feedback Croatia

5.6 Validation feedback Serbia

5.7 Validation feedback Romania

5.8 Validation feedback Bulgaria

5.9 Validation feedback Ukraine

6. OUTLOOK

ANNEXES

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ANNEX 1: INTERVIEW GUIDELINE DANUBE SCHOOL SHIP

Interview Guideline Danube School Ship

1. Ship concept

1.1. Would you prefer the Danube School Ship to be a new institution for international nautical education or a common used infrastructure of existing national educations and trainings?

☐ New E&T institution ☐ common used ship for existing national education and training institutions
☐ Other: _____

1.2. Which type of ship would be the best for the specific training purposes?

☐ Pushed convoy ☐ Motor cargo/passenger vessel
☐ Tankship (dangerous goods) ☐ Motor cargo/passenger vessel + barge(s)

1.3. Do you think that the ideal school ship is a

☐ reconstructed passenger ship ☐ reconstructed motor cargo vessel
☐ reconstructed pusher ☐ new/special school ship construction
☐ school barge attached to an operating convoy
☐ Other: _____

1.4. Which facilities should be on board?

☐ Dedicated teaching room ☐ Accommodation area
☐ Engine workshop ☐ Kitchen and recreation area
☐ Other: _____

1.5. For how many students should the Danube School Ship be constructed for?

☐ _____

2. User groups

2.1. Who do you think would be the main users of the school ship?

☐ Apprentices (dual education system) ☐ Career changers ☐ Practitioner
☐ Students (with little practical experience within their education) ☐ Others

2.2. Estimation: How many users would your country/institution/school have per year/trip?

☐ _____

2.3. Estimation: How many days per year would your country/institution/school use the school ship?

☐ _____

3. Education

3.1. How important is the training of the following skills on board?

1 … very important ::: 5 … not relevant

Skill	Rating				
	1	2	3	4	5
Manoeuvring/ ship handling					
Technical training (in the machine room)					
Handling of cargo					
Dealing with passengers/guests					
Emergency training					
Use of River Information Services					
Handling of barges in a convoy					
Navigation through locks					
Navigation under the influence of wind					
Radar navigation under different weather conditions					
Use of new technologies (e.g. LNG, or _____)					
Foreign language skills (e.g. English)					
Others:					

3.2. Do you consider simulators on board as useful?

☐ No (simulators only at education & training institutions)
☐ Yes (if yes what kind of simulators)
☐ Ship handling simulator ☐ Radar simulator ☐ Cargo handling
☐ Engine room simulator ☐ Radio simulator ☐ Inland ECDIS

3.3. Do you consider a double steering post on the main bridge as useful?

☐ YES, Because: _____
☐ NO, Because: _____

3.4. Does it make sense to have further education programmes on the ship (life-long-learning)?

☐ No
☐ Yes – national language(s): ☐ RIS-course ☐ fuel-efficient driving ☐ emergency trainings
☐ Yes – English language: ☐ RIS-course ☐ fuel-efficient driving ☐ emergency trainings

4. Tour – International experience

4.1. Would you be interested in:

☐ national tours ☐ international tours
If international, preferred countries to travel to: _____
_____

☐ only national teams ☐ mixed teams (students & teachers from different countries)
If mixed, preferred countries to travel with: _____
_____

4.2. Which specific stretches of the Danube or its branches would be of special interest, and why?

☐ _____

4.3. What would be your preferred months for using the school ship?

1	2	3	4	5	6	7	8	9	10	11	12

5. Financing

5.1. Would you be interested to make use of a Danube School Ship?

☐ YES, because: _____
☐ NO, because: _____

5.2. Would you be interested to participate in an international association running the School Ship?

☐ YES, because: _____
☐ NO, because: _____

5.3. Would you be willing to financially contribute to the purchase and/or operation of the Danube School Ship?

☐ YES, because: _____
☐ NO, because: _____

6. Comments:

Thank you!

Name:
Organisation: focus on ☐ cargo ☐ passengers
May your name be mentioned? ☐ Yes ☐ No
Are you interested in further information? ☐ Yes ☐ No
e-Mail:

ANNEX 2: DANUBE SCHOOL SHIP CONCEPT OUTLINE

Danube School Ship Concept Outline

1. Need for a Danube School Ship

The idea of a modern Danube School Ship - to at least partly solve the lack of qualified nautical personnel - was already borne some years ago. The partners of the international Danube educational project HINT (www.hintproject.net) further discuss this idea with potential users (interviews, workshops) and develop a concept for the implementation. Balanced acquisition of both knowledge and practical skills is an essential prerequisite of good training resulting in highly performing crew on board ships. On-board practical training possibilities in inland navigation are unfortunately scarce in the Danube riparian countries, which makes development of required competencies by inland navigation crew members very difficult.

2. Best practices

Characteristics of training ships and simulators available in the South East regions do not reflect the latest technologies and therefore do not allow candidates to get the necessary skills which would facilitate subsequent mobility in all inland waterways. Exchange of know-how and adoption of best practices from Western Europe is therefore an essential part for the development of an innovative concept of a Danube School Ship. The acquistion costs depend on type and configuration of the vessel, ranging from 3 to 5 million EUR. There are different operator models possible, which influence the allocation of operational costs. The HINT partners analysed already some school ships in Western Europe, the table below shows two examples.

©via donau

Themis II (NL)

- Operator: KTA Cenflumarin
- Year of construction: 1965
- 55m long / 7m wide
- Draught: 1,4m
- Students: max. 28 during one training
- Propulsion: 2x Scania 360 PK
- Navigation areas:
  - Port of Antwerp/Rotterdam/Amsterdam
  - Albertkanaaal
  - Maas/Waal/Rhoine


©http://www.marinetraffic.com/ais/shipdetails.aspx?MMSI=205513690

Province de Liège (BE)

- Operator: l'Ecole Polytechnique de Huy
- Year of construction: 2012
- 50m long / 6m wide (ligther 34m long)
- Draught: 1,6m
- Students: max. 20 during one training
- Propulsion: 2x Scania DI 12-59M
- Navigation areas:
  - Canal de Saint-Quentin/Canal du Nord

3. Concept outline for future Danube School Ship

There are many possibilities consindering the technical, organisational and educational design of a Danube School Ship. The Danube School Ship concept will establish a framework for the use of a common Danube School Ship. The concept will include all aspects related to vessel (i.e. type, size, equipement, motorisation, innovative technologies), ownership (i.e. purchase, rent, operator model), navigation route (i.e. countries, streches of special interest), training plan, estimated investment and operation costs and possible financing. Similar approaches will be used for the development of concepts for the nautical and the port logistic simulators, all of them to be finished in Spring 2014.

- **Type of vessel**
  A Danube School Ship could be a push convoy or a motor cargo/passenger vessel. It either will be a refurbished used vessel or a newly built ship according to the specifications of the Danube School Ship concept. Depending on the requirements in the Danube region the ship could focus on different types of transport, e.g. cargo, dry, passenger or dangerous goods.

- **Organization / Ownership**
  The Ship could act as an independent education / training institutions offering (international) curricula / courses based on future international harmonized standards like STCIN or could be rented by existing institutions to upgrade their national curricula / courses. Also a mixture could be possible, e.g. basic education stays national and some training for further education is offered internationally.
  The future Danube School Ship could be owned by a transnational association, consisting of all participating countries i.e. education & training institutions, or by one owner organization and the other institutions rent the ship for certain periods of the year.

- **Training plans & User groups**
  Needless to say, to train navigational skills is the main target of a school ship. Based on the analysis of the national curricula and expert interviews the training plans will be elaborated and will strongly differ for different target groups like apprentices (having already practical training), students (with little experience on board), career changers or nautical personnel (further education).

- **Navigation area**
  The Danube school ship could run the whole Danube between Germany and the Delta or only in certain countries, interested to participate. The advantage of a common used ship is that it could be run with international groups of trainers and trainees. This way the trainees learn to work in international teams and get to know foreign stretches of the Danube.

- **Costs**
  The purchasing costs should be borne by the involved countries (public and private sector) and co-financed by the European Union. The operating expenses have to be borne by the users (i.e. the nautical schools, authorities in charge, private / industry sector) based on usage times.

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ANNEX 3: NELI REPORT "IDENTIFICATION AND ANALYSIS OF NETWORK REQUIREMENTS"

Cooperation-Network for logistics and nautical education focusing on
Inland Waterway Transport in the Danube corridor
supported by innovative solutions

Identification and analysis of network requirements

(Act. 3.1, Period 3.2)

Document ID:	Identification and analysis of network requirements	
Act.:	WP3, Act. 3.1	
Author / Project Partner:	Date:	Version:
Savu/ IMST	24.10.2009	ver. 0.1 (draft)
Savu/ IMST	10.01.2010	ver 0.2 (draft)
Ghiba / IMST	12.02.2010	ver. 0.3 (draft)
Savu/ IMST	22.02.2010	Ver. 1 (final, except HR&BG)
Pervan/ FPZ, Manole/ CER	30.05.2010	ver 1.1 (final, except BG)
Ivanov/BMA , Manole/CER	29.11.2010	ver.1.2 (final)

Table of Contents

1. List of abbreviations

Act.	Activity
AF	Application Form
AIS	Automatic Identification System
AT to UA	Austria, Hungary, Slovakia, Croatia, Serbia, Bulgaria, Romania, Ukraine
BE	Belgium
BG	Bulgaria(n)
CCNR	Central Commission for Navigation on the Rhine
CERONAV	Romanian Maritime Training Centre
CRUP	Inland Navigation Development Company Centre, Zagreb, Croatia
DE	Germany
E&T	Education and Training
ECDIS	Electronic Chart Display and Information System
ECTS	European Credit Transfer System
EDINNA	Education in Inland Navigation
ELA	European Logistic Association
EU	European Union
EWITA	European Web Platforms and Concepts for Intermodal Inland Waterway Transport
FP7	7th Framework Programme
FR	France
HR	Croatia(n)
HU	Hungary
IMST	University of Craiova, Romania
INeS	Inland Navigation eLearning System
IPA	Instrument for Pre-accession Assistance
IPTC	International Port Training Conference
ITC(s)	Information and Training Centre(s)
IWT	Inland Waterway Transport
JTS	Joint technical Secretariat
KVD	University of Zilina, Department of Water Transport
NAIADES	An Integrated European Action Programme for Inland Waterway Transport
NELI	Cooperation -Network for logistics and nautical education focusing on Inland Waterway Transport in the Danube corridor supported by innovative solutions
NL	The Netherlands
ONMA	Odessa National Maritime Academy
PLATINA	Platform for the Implementation of NAIADES

PP(s)	Project Partner(s)
RIS	River information Services
RO	Romania
RSOE	National Association of Radio Distress-Signalling and Infocommunication, Budapest, Hungary
SEE	South East Europe
VIA	via donau, Vienna, Austria
WP	Work Package
WPL	Work Package Leader
10% PP	Project partner receiving EDRF funds under the 10% flexibility rule

2. Introduction

IWT represents an important activity for the economy of the countries in the Danube corridor and it is defined as a strategic sector for each country. Recently, its importance has been more and more acknowledged at EU level and a harmonisation in this field is imminently called for. Both EU and non-EU member states are now struggling to reach harmonisation through common understanding and policies. In this context, NELI is creating a transnational cooperation network among the IWT education and training organisations intended to support EU efforts. The network will be further supported by the national political stakeholders and organisations for the development of human potential in the fields of research and innovation with special regard to IWT (logistics, nautical) and future long term common activities on a transnational basis.

The objective of Act. 3.1 is to identify and analyse the network requirements through the identification of the existing entities activating in the field of education and training for the IWT / logistics sector and the creation of a database with the most relevant information about the types of institutions, courses/ subjects they provide on IWT and logistic, duration of courses etc. in order to have a better understanding of the context in which the network will be created.

The existing projects and initiatives, such as PLATINA were also taken into consideration in order to ensure compliance regarding the already developed aspects, to which further SEE national specific requirements were added. Both education and training suppliers (nautical, multimodal institutions, their location, current learning subjects, materials and curricula) and "demanders" (inland ports, transport carriers, etc.) sides were put under scrutiny to observe similarities and differences and also needs and improvement possibilities.

3. Methodology

The methodology employed for the implementation of this activity consists of the following main steps:

Table 1

Step	Activity
1	Exchange of information with PLATINA
2	Identification of other IWT nautical and logistics E&T institutions in the Danube corridor from AT to UA
3	Identification of SEE specific requirements regarding the IWT and logistic field
4	Establishment of common criteria for the analysis of the identified E&T institutions
5	Elaboration of the specific questionnaire
6	Completion of the overall database
7	Report on identification and analysis of network requirements

Activity 3.1. - Identification and analysis of network requirements – with a duration of 6 months, initially scheduled from April till September 2009, was extended until November 2009 and thus shortened to 5 months only. This activity involved a heavy workload and the loss of three months (April, May, June) caused by the late start of the project and non-involvement of IPA Partners in absence of relative Grant Contracts could not be compensated despite the sustained efforts so as to meet the timeframe in the AF. Appropriate request for extension for of activity 3.1 until November 2009 was sent to JTS in due course and accepted.

4. Identification of nautical and logistics E&T institutions in the SEE-Danube region

For the set-up of the cooperation network some preparations need to be made consisting of the identification of the E&T institutions focusing on the inland navigation transport, the analysis of their current activity and future development potential as well as the implementation of common training requirements and standards.
In this sense IMST elaborated a set of working documents to be used by NELI PPs.

4.1 Exchange of information with PLATINA

The exchange of information with PLATINA was the first step taken by the Act. Leader IMST in order to take over the yet-existing relevant information regarding the E&T entities in the Southeast European area. PLATINA Partners created a database with basic information on the nautical E&T institutions both in Western Europe and some of the East European countries. To this inventory NELI added basic information for Ukraine and other specific information on the IWT taught subjects, duration of courses, practical experience of the teachers, practical stages and use of eLearning based on the replies to the questionnaire.

4.2 Identification of other IWT nautical and logistics E&T institutions in the Danube corridor from AT to UA

To be able to establish the transnational cooperation network in the SEE-Danube region, NELI partners decided to identify both nautical and logistics E&T providers from AT to UA.

In a first phase NELI PPs filled in the contact information as shown in the Table 2 below.

Table 2

Name of institution	**Contact**				
	Contact person	Address	Phone	E-Mail	Website

The table was further developed to include the following data:

Table 3

City / Town	The name of institution (in original language)	The name of institution (in English language)	Type of school	Degrees or certification	Duration (in years)

4.3 Identification of SEE specific requirements regarding the IWT and logistic field

One of the major issues in the IWT sector, with respect to education, training and qualification of IWT personnel, is that unlike the maritime sector, IWT lacks standardized international regulations. This issue, a major concern of the European community, is already being addressed by other projects and associations whose work is in full progress – such as PLATINA and EDINNA, yet requirement for a different approach in the Danube corridor is a reality that can not be denied.

Specific reality of the South East region, where Danube riparian countries like Bulgaria and Romania entered the European community only three years ago and where the process of harmonization of IWT legislation is yet to be completed requires a different set of actions and

foremost the cooperation of all IWT actors – political institutions, associations, E&T institutes and private stakeholders. Efforts are being made by European organisations (see the Danube Commission) or European initiatives yet the ultimate goal of raising quality and quantity of services in the Danube corridor has to overcome various obstacles intrinsically connected to the Danube infrastructure and harmonization of training standards of IWT personnel.

One of the European desiderates related to free movement of European citizens is heavily restricted for IWT manpower by lack of appropriate legislation governing certification of relative competencies in this field. Whereas regulations governing certification of Rhine IWT personnel include a clear set of provisions, the Danube sector remains an uncharted territory.

4.4 Establishment of common criteria for the analysis of the identified E&T institutions

All identified entities were contacted to find out their problems, needs, expectations and endeavours in order to formulate the minimum 5 criteria against which the analysis was to be elaborated. In the end 7 criteria were selected and added to the table in order to offer a much clearer picture:

Table 4

Subjects with elements of inland water transport	Duration of the subject / ECTS (hours per week)	IWT related topics	Practical experience of teachers	Practical stage of students	Plan to develop subjects / courses in the area of IWT and logistics	E-learning materials

4.5 Elaboration of the specific questionnaire

Act. Leader IMST together with WPL KVD and VIA elaborated a questionnaire based on the already defined criteria. The PPs from all participating countries sent it to all identified E&T institutions and their feedbacks were collected and sent to IMST.
The questionnaire represents Annex 1 of this document.

4.6 Completion of the overall database

Upon the collection of questionnaires, IMST created a final database (Annex 2) illustrating the current status quo of the education and training in the field of inland waterway transport in countries from AT to UA. A number of 135 E&T institutions were identified. Table 5 below shows them categorised by level of knowledge:

Table 5

Country	TOTAL	Vocational schools	Secondary schools	High schools / Colleges	Universities	Training centres
Romania	13	6	0	0	5	2
Hungary	47	0	0	17	20	10
Serbia	14	8	0	0	6	0
Austria	20	4	0	5	11	0
Slovakia	13	0	8	1	4	0
Bulgaria	10	0	0	1	4	5
Croatia	8	1	0	0	6	1
Ukraine	16	0	2	3	11	0
Total	**135**	**18**	**10**	**27**	**67**	**13**

4.7 Report on identification and analysis of network requirements

This report on the identification and analysis of network requirements has been elaborated by Act. Leader IMST based on the inputs received from the other PPs involved.

5. Analysis of collected inputs

The identification of IWT actors with activities in the Danube corridor is complementary to the database obtained from PLATINA project, but with special attention to both IWT and logistics. All PPs have identified E&T institutions in their countries and contacted them to obtain more information about their location, duration of studies, type of school and others.
After studying the conditions of the labour market from the Danube corridor, there have been revealed some specific requirements such as:

- Identification of the courses/ subjects from all actors in IWT and logistic field from the SEE region and the number of lessons and credits of these courses. Also, the study must show how much time is allocated for IWT and logistic.
- Other criteria regarding the IWT and logistic refer to related topics inside the courses/ subjects presented. Some of them are: Navigation; Waterways; Ship building; Ship manoeuvring; Inland ports and terminals; Policy and law; Cargo handling; Storage and passenger transport; Marine, electrical, electronic and control engineering; Maintenance and repair; Communication; Health, Safety and environmental protection; Specific requirements on board (tanker) ships with dangerous cargo; RIS; Inter-modal waterway transport; Safety and security; German, English language; Ship management.
- Other requirement identified is represented by the practical experience in IWT and logistics of the teachers.
- Other requirement refers to the practical stages of the students during the courses/ subjects.
- Other specific requirement identified refers to future plans for the educational and training centres, i.e. development and implementation of new courses/ subjects in the area of IWT and logistic.
- Regarding to eLearning, a specific requirement consists in the utilization of eLearning materials for teaching activity.

6. Analysis of IWT Education and Training Institutes of countries from SEE area

6.1. Austria

There is one school in Vienna (Vocational School for Machine and Production Technology) where nautical education takes place within a three years' dual training system. The curriculum is very much orientated on the German one. Only 5-7 students join this education program every year, most of them working in passenger shipping.
At university level there isn't any institute or study program specialized on IWT. The questionnaire was sent to 22 Universities dealing with transport and/or logistics, most of them technical or economics Universities. Only 8 claimed that they teach some lessons on IWT.
There are two types of vocational schools in Austria: higher vocational schools, where students gain a graduation degree and three years' dual vocational schools. The first category of schools generally includes technical or economical school focused on logistics. In five of them IWT plays a minor role. At three locations a dual vocational training is offered for forwarding merchants. Some of the apprentices are employed in the IWT sector.
Throughout all education and training institutes (except the nautical education in Vienna) there is not a single subject dealing exclusively with IWT. At university level IWT topics are covered within subjects dealing with transport management, transportation systems or transport logistics. Within these subjects of 2 to 4 ECTS IWT topics are taught in average of 1-2 lessons. IWT is taught on a very basic level - the most common topics are attributes of IWT and comparison of transport modes, important waterways and ports, transport planning, types of goods and ships, market and prices, telematics in IWT. There is one exception: the Bachelor and Master Programme for "Logistics and Transport Management" at the University for applied Sciences from Vienna, where a student gets approx. 9 lessons on IWT during his/her studies. At the vocational schools IWT is thought approx. one hour a year. The topics are quite the same as at the university level – only the very basics are taught.
Except for the nautical education and guest lectures, there is no teacher with IWT background. At university level most teachers have a university background without practical experience. Especially at Universities of applied Sciences guest lectures from experts are very common (also Via Donau employees are regularly giving guest lectures). Some of the vocational teachers have practical background e.g. as forwarding merchant.
Regarding to Practical training / internships at Universities, obligatory internships is foreseen. At Universities of applied Sciences an internship of 1 semester has to be done within a Bachelor Program consisting of 6 semesters. Most of the Universities of applied Sciences state that those internships can also be done within the IWT sector (e.g. Via Donau is regularly taking interns). At most higher vocational schools internships are not foreseen but projects and excursions are common. Apprentices of vocational schools are working at a company and visit school only part time (all in all three months a year) – that means they are practicing most of their educational time. Some of the apprentices are employed in the IWT sector.
Most of the schools use e-based systems for the exchange of information (e.g. teaching materials, homework), communication (e.g. forums) and administration (e.g. registration for courses, marks). Real e-Learning tools or Platform like INeS are not common. Some of the schools in the list are member of the EWITA (www.ewita.info), an educational user forum where they contribute to the development and user friendliness of INeS Danube.

6.2 Romania

Thirteen IWT Education and Training Institutions, including 5 universities, 6 vocational schools and 2 training centres have been identified in Romania. IWT plays a minor part however in most of them and only one university, one vocational school and two training centres.
Universities and vocational schools develop their curricula under the guidance of the Ministry of Education or the Ministry of Transport, as applicable. At university level IWT topics are covered within subjects dealing with transport management, transportation systems, navigation and ship manoeuvring the ship, law for IWT, theory of ship construction, navigation electronics and electric instruments, transportation of goods, and telematics in IWT, market and prices, standard languages for navigation. Duration of studies is four years but only two years are dedicated to specialty disciplines. Most lecturers have only a university background and little experience or at all in IWT, guest lecturers being a wide spread practice. Practical training in IWT ships is provided, summer practice on inland ships being mandatory at IMST for instance, where an internship of 6 months is a compulsory requirement. As for logistics, there is no master programme for "Logistics and Transport Management" in IWT and out of the 5 universities delivering transport and/or logistics courses which replied our questionnaires only one confirmed delivery of a course on IWT RIS services.
Curricula do not differ much at vocational school level except that only basics are taught. Duration of studies is also 4 years but lecturers here have a practical background, such as former experience as forwarding agent or on inland vessels. Practice on board inland ships or within an IWT company is a standard mandatory procedure as well.
University or high school graduates may start a career in IWT ships after passing an examination with the Romanian Naval Authority and obtaining appropriate competency certificates. Attendance and graduation of Ceronav courses for university and vocational school graduates is mandatory however before the examination, Ceronav being the single national public body, under direct subordination of the Ministry of Transport, in charge with training of maritime and IWT personnel.
In this capacity, Ceronav delivers tailor made IWT courses meeting the demands of the IWT industry, in areas such as ship building, ship manoeuvring, ship operation, use of radar and VHF, navigation in inland waterways, inland ports and terminals, specific naval legislation. CERONAV lecturers have practical experience in IWT and hold IWT trainer certificates. Use of a computer assisted training and testing platform and a virtual library is also provided.
The logistics training centre identified, AFM-MKT, a member of the European Logistic Association, develops its logistic and multimodal transport courses based on European standards accepted by ELA.
As for future careers in IWT, CERONAV trainees also have to pass examinations with the Romanian Naval Authority and obtain applicable competency certificates in order to operate in IWT while AFM-MKT trainees are issued logistic certificates which qualify them for job positions in IWT Logistic areas.

As a general conclusion:

- Curricula of most Romanian E&T institutions meet the general European guidelines but lack of cooperation for harmonization of contents at various levels of education is apparent;
- Issuance of IWT proficiency certificates for university or vocational school graduates is not regulated by national law (certificates for equivalent competencies are issued)
- E-learning is poorly developed and practically non-existent in vocational schools.

6.3 Slovakia

In the Slovak Republic the academic education in the field of inland water transport and logistics is only realized at two universities, University of Zilina from Zilina and Slovak Technical University from Bratislava. The University of Zilina is one of the oldest and biggest universities in the Slovak Republic. Nowadays it has seven faculties. Faculty of Operation and Economics of Transport and Communications, the largest faculty at the university, has four departments which are focused on air, rail, road and water transport.
The department of Water Transport, which was established in 1991 to cover lack of well-educated workers in the area of inland water transport, is specialized in the education of students who can work in shipping and forwarding companies (Slovak Shipping and Ports), inland ports (port of Bratislava or port of Komárno) or state authorities (State Navigation Administration or Ministry of Transport of the Slovak Republic). The education system has a general character. The study programme consists of:

- Technical courses like Shipbuilding, Technology of Navigation, Technical Equipment of Ports, Repair and Maintenance of Vessels, Waterways and Ports, Science of Commodities.
- Economic courses like Operation and Economy of Water Transport, Operation and Economy of Shipping Companies.
- Legal courses like Sea and Inland Law.

During study students have to attend practice in various departments of a shipping company or on boats as crew members during their summer holidays. The duration of these practice periods is about one or two weeks.
The staff members, who lecture at the Department of Water Transport, have completed minimally the third degree (PhD degree). Most of courses are lectured by internal members, only a few are delivered by external teachers. In 2005, the Department of Road and Urban Transport opened a new field of study which is called Forwarding. Graduates of this discipline can work at forwarding or transport companies like forwarders. Only a few courses (Technology of Water Transport, Business and Operation Activity in Water Transport and Sea Transport and Sea Containers), which are lectured by the members of the Department of Water Transport, are targeted on the field of IWT. At the Slovak Technical University in Bratislava there are two departments which are partially targeted on inland water transport. One of them (Department of Automobiles, Ships and Combustion Engines, Faculty of Mechanical Engineering) focuses on shipbuilding of small yachts and vessels for leisure activities, while the other one (Department of Hydro-techniques, Faculty of Civil Engineering) is specialized in construction of waterways and dams. Nowadays there aren't any secondary schools (high schools) which are targeted on inland water transport. Most of secondary schools such as Stredná priemyselná škola dopravná (Secondary School of Transport), Bratislava or Stredná priemyselná škola strojnícka (Secondary School of Mechanical Engineering), Bratislava specialized on transport, are focused on road and railway transport. Inland water transport and logistics are only mentioned in courses like Transport Geography, Logistics, Logistics in Transport or Forwarding. Study lasts for 4 years; students have to take final leaving examination (called the maturita). State Navigation Administration (Štátna plavebná správa), Bratislava, as the state authority, responsible for the safe navigation on the waterways, realizes the examinations for skippers of small inland or sea pleasure crafts. Education of applicants in the short courses such as shipbuilding, navigation science, navigation, navigation geography, meteorology, first aid or legislative rules is provided by some yachting clubs or specialized private schools.

6.4 Serbia

There are vocational schools in Serbia where students gain a graduation degree. The questionnaire was sent to 8 institutes. In three of them IWT plays a major role. Approximately 30% of the apprentices are employed in the IWT sector. There are three schools in Serbia where nautical education takes place within a four and three years' education system:

- School of shipping, shipbuilding and water civil engineering – Belgrade (three curricula - nautical technician- inland waterway department, duration 4 years, deckhand, duration 3 years and marine engineer, duration 4 years)
- High Traffic School "PINKI" – Novi Sad (one curriculum - nautical technician- inland waterway department, duration 4 years)
- Technical School – Kladovo (one curriculum- marine engineer, duration 4 years).

Throughout the entire education system there is only one single subject offered dealing exclusively with IWT – like Stability and ship loading, Sailing regulations and signalling, Inland waterway navigation, Practical training. School of shipping, shipbuilding and water civil engineering has been established over 60 years ago and has long been the only school in Serbia for inland navigation. In the last five years the school has 30 students every year in nautical technician department and 20 students in the deckhand department. Interest in marine engineering is reduced, the school having only approximately 10 students every other year. Some of them are employed in the IWT sector, and some of them are employed in the sea going vessels.

High Traffic School "PINKI" – Novi Sad has had one nautical technician department in the past 10 years with an audience of also 30 students per year. Starting with last year, the Technical School – Kladovo has also established one marine engineer department (30 students).

There are more schools at the secondary schools level, but their study programmes do not include IWT. These are mostly technical schools with a focus on logistics and do not offer curricula exclusively related to IWT, although some of the apprentices are employed in the IWT sector. All these schools are public institutions and their curricula were developed under the Ministry of Education.

There is no institute or study program specialized on IWT at University level. The questionnaire was sent to 6 universities dealing with transport and/or logistics, most of them technical Universities. Only two Institutes (University of Belgrade - Faculty of transport and traffic engineering - Department for Water Transport and the Military Academy from Belgrade) claimed that they teach some lessons in IWT. IWT is taught on a very basic level - the most common topics are attributes of IWT and comparison of transport modes, important waterways and ports, transport planning, types of goods and ships, market and prices. However, we can say that certain subjects like Navigation in the water transport, Inland Security, River informational services, Ship manoeuvring, Towing, Pushing are related exclusively with IWT. Except for the nautical education there is no teacher with IWT background. At University level most teachers have a University background without practical experience. Some of the vocational teachers have practical background e.g. as practical training or inland navigation.

Regarding practical training obligatory internships are foreseen after graduation. At most higher vocational schools internships are not foreseen but projects and excursions are common. Apprentices of vocational schools are working at a company and visit only part time (two weeks a year).

Most of the schools use e-based system for the exchange of information (e.g. teaching materials) and communication. Real e-Learning tools or Platform like INeS are not common.

Teachers responding the questionnaire showed interest in receiving more information and teaching materials on IWT. The network has to give the possibility to supply those teachers with suitable information and create awareness for IWT.

6.5 Hungary

The Hungarian IWT education is divided into two sections: nautical and logistics.
The nautical education is controlled by the National Transport Authority which is governed by the Transport Ministry. Education of students for various qualifications (e.g. shipmaster, helmsman, radar navigator, deck officer, etc.) is provided by certified training centres in vocational education, but the examination is made by the National Transport Authority. All qualifications are based on elementary graduation except for the boatman which does not require graduation.
The naval technician education is a vocational education based on the General Certificate of Education. The curricula contains boatman, ship machine man and boatswain knowledge. The naval technician education is governed by the Ministry of Education but the Minister of Transport is responsible for it.
No institute or study programme for nautical education exists at university level.
The logistic education is controlled by the Ministry of Education. The secondary level vocational study programmes are controlled by the National Institute of Vocational and Adult Education through the National Education Book (NEB), which stipulates the basic competencies, skills and curricula. The three logistic education programmes in the NEB are based on the General Certificate of Education.
The IWT plays a minor role in the NEB curricula of logistics education programmes. Typically there is not a single subject dealing with the IWT. As a rule, 1-2 lessons dealing with IWT are included in courses such as “freighting”, “logistics”, “logistic systems” and “logistic informatics”. The international transport and logistics manager education at the Széchenyi István University is the only one where the subject of “waterway freight” dealing with the water transportation is taught.
BSc and MSc level study programmes are developed by the universities and colleges taking into account the High Education Act and are subject to approval of the Accrediting Board.
There are no BSc or MSc study programme specialized in IWT or water transportation. The Budapest University of Technology and Economics offers IWT specialization possibility for the students of BSc Transport Engineer. This specialization means 30+15 ECTS subjects. This BSc education is based on the earlier MSc transport engineer study programme, which contained the same specialization possibility. The student interest is very low, about 1-2 students in 5 years.
Although the Széchenyi István University, the University of Szeged and the Eötvös József College deal with IWT in 2-4 ECTS subjects, most of MSc and BSc logistic engineer, transport engineer and logistics management programmes do not have any subject in IWT. According to our questionnaire a lot of universities and college want to develop the IWT content in the existing courses.
Except for the nautical education and guest lecturers there is no teacher with IWT background. Many in-house lecturers have practical experience in logistics but few in road or rail transport. IWT related subjects are taught by guest or half time lecturers with good IWT experience.
Regarding to practical training, mandatory internship is foreseen. In NEB programmes 30-50% practical training, consisting of laboratory or on field exercise, is included in the education programme. At university level the obligatory practical training is 4-8 weeks internship (e.g. in a logistic company) throughout the entire period of education.
Most of the schools and training centres use e-based system for administration and communication in the students-teachers-school relation. But real e-Learning tools are not used in logistic education. According to feedback received to questionnaire, training centres, colleges and universities dealing with IWT would be very interested in e-Learning tools and would basically use them for distance education, subject however to free of charge receipt thereof.

6.6 Bulgaria

There are ten IWT education and training institutions in Bulgaria: one vocational high school, four universities and five training centres.
Students in Ruse High River Shipping School can graduate, on completion of a four years' education cycle, in following specialties: "Ship machinery and mechanisms," "River Navigation, "Ship Electrical Equipment", "Ports and Fleet Operation" and "Shipbuilding." Courses end with a school leaving examination to acquire secondary education and state examination to acquire a third level qualification in the specialty. Training on a river ship is mandatory and diplomas issued are recognized by the International Maritime Organization IMO, which entitles the graduates to sail ships under both Bulgarian and foreign flag. Teachers have good experience in inland waterway transport but no e-learning materials are however used.
IWT related courses with a duration of 4 years are delivered in all Bulgarian universities except the Centre for Continuing Education which proposes parallel training of students for acquiring additional or new qualifications under two forms of education: specialties and courses with a duration from five to six semesters. Practical training is mostly mandatory and is arranged either on board river ships or in workshops, transport terminals and transport companies. Practical experience and IWT certification of teachers are lacking in all universities except for the Technical University of Varna, yet use of e-learning tools in the process of education is a general practice in most universities.
A positive aspect also noted in the Technical University of Varna is that graduates in the specialties "Technology and Transport Management" and "Fleet and Ports Operation" acquire Bachelor's degree as Transport Engineer and Master's degree as Master Engineer, specialties in high demand in Bulgaria and receive a comprehensive education in Bulgarian port and transport facilities of the country, agent companies, shipping companies, forwarding companies, etc. Candidates for a Master's degree in Engineering were also accepted in the University of Ruse starting with 2003.
Activity and training programs of the training centres are approved by the Executive Agency Maritime Administration. Duration of courses divided into four sections: Navigation, River Works, Legislation and Technical Training is one month after which graduates acquire a Certificate for skipper of small vessel which entitles them to work as seamen on river ships. Practical training is included and teachers have necessary IWT qualifications and certificates.

Conclusions:

- Training programs of most E+T institutions are in line with the common European guidelines but the equipment is outdated and it does not meet the requirements of IWT business.
- Certificates issued by the Executive Agency Maritime Administration are recognized by the international institutions and entitle seafarers to work on Danube sailing ships.
- E-learning is underdeveloped or practically inexistent in vocational schools and the training centres.
- There are no simulators for training and testing the knowledge of the candidates for acquiring the qualification of Inland Navigation Captain.
- Specialized river vessels are not equipped for practical training for school and university students under guidance of qualified teachers.
- There is a lack of Information and Training Centres for promotion of inland transport and associated professions on the Danube river;
- Most of the schools use e-based systems for exchange of information (e.g. training materials) and communication. Real e-Learning tools or Platform like INeS are not common.

6.7 Croatia

There are eight Education and Training Institutions that are identified in this report: six universities (faculties), one vocational school and one training centre.

University of Zagreb, Faculty of Transport and Traffic Sciences has the most significant part when it comes to education in inland water transport. Faculty of Transport and Traffic Sciences - Water department is the only institution in Croatia that provides high level education in the field of IWT. Faculty study is divided in three parts: Traffic study, Intelligent Transport Systems study and Aeronautics study. Traffic study has 7 Departments: Road, City, Railway, Airway Traffic, Postal Traffic, Information - Communication Traffic and Water traffic. On third year of education students can choose the department they want to attend. This means that students get basic knowledge in the field of transport and traffic in the first stage and later they specialize in the chosen department. Study of water traffic is focused on logistics, technology and planning in maritime transport and inland waterways. All courses studied in this department are in a specific way (for example: Integral and Intermodal systems, Water transportation planning, Ports, Harbours and terminals) or in a general way (for example: Inland waterways) connected to IWT. Engineers of water transport are qualified to work in harbours, terminals, local and state authorities for transport, forwarding and shipping companies etc. All students are required to complete practical work within their profession. It should last for one month and students should write a working journal and hand it over to Faculty when the internship is over. There are also organized student visits to inland water or maritime harbours (for example Vukovar or Rijeka). All teachers involved have some kind of practical experience in IWT.

Faculty of Mechanical Engineering and Naval Architecture is mostly based on technical requirements of ship construction and shipbuilding that can relate to inland water transport. No specific courses regarding IWT are studied. Students are getting practical education in laboratories and workshops at the Faculty.

Being a country located on the shores of the Adriatic Sea, Croatia has four universities that provide education for maritime transport, and do not teach any subjects dealing with IWT. Universities of Rijeka, Split, Zadar and Dubrovnik have similar curricula. Faculties of Maritime Studies in Rijeka and Split provide both undergraduate and graduate programmes, while Maritime departments in Zadar and Dubrovnik only offer undergraduate programmes. After finishing these studies, students can attend careers in ship command, management in maritime companies and maritime sailing.

There is only one vocational school (Obrtnička Škola Sisak) whose curricula are directly focused on IWT. There are also other vocational schools that are focused on education in maritime transport and which are not mentioned in this report. One teacher has practical experience working in a river transport company.

Dunav – Lloyd Company offers week courses for those already employed in the branch of inland waterways. These courses are under the surveillance of the Ministry of Sea, Transport and Infrastructure and after the courses are finished, attendants get the certificate on inland navigation mechanic and inland navigation assistant.

Real E – learning systems are not present in any of these institutions, although every faculty or department use Internet to exchange information about curricula, exams or teaching materials.

6.8 Ukraine

As a 10% PP, ONMA is only responsible for the identification of E&T institutions in UA and sending out the questionnaire in order to collect more data regarding the IWT and IWT – related courses taught in UA. Therefore, ONMA does not contribute with an extensive analysis of the education in the field of IWT.

7. Comparative analysis of nautical, logistics and shipbuilding and engineering institutions in SEE-Danube countries in terms of IWT content

Specific reports on the IWT E&T have been elaborated by the NELI partners for Austria, Romania, Slovakia, Hungary, Serbia, Croatia and Bulgaria. A comparative analysis based on the data collected so far and findings of above reports highlighted the following table.

Table 7

Country / Types of studies	Austria	Hungary	Romania	Serbia	Slovak Republic	Bulgaria	Croatia
Vocational school / secondary school level of IWT in lessons	• 4 vocational schools medium IWT level lessons (mostly for forwarding agents) 3 years' duration • 5 secondary schools focused on logistics with minor IWT content / 5 years' duration Part time school with large practicing program	not mentioned	6 4 years duration Specialized teachers	8 4 years' duration high level of IWT lessons in 3 vocational schools	8 mostly focused on transport, minor IWT content in courses like Transport Geography, Logistics 4 years' duration		single vocational school with full IWT curricula 4 years duration

High school/college level / level of IWT in lessons		17 duration between 2 to 3.5 years topics: mostly logistics and transport	not mentioned	not mentioned	1 3 years' duration focused on waterways, ports	1 4 years' duration focused on river navigation, ship equipments, ports and port operation	not mentioned
University level / level of IWT in lessons	8 of 22 universities organize very basic lessons Specialized teachers: guest experts	20 4 years duration No teacher with IWT background Specialized teachers: guest experts	5 4 years duration (only 2 years for specific lessons) / medium IWT level lessons Specialized teachers: guest experts	6 3 or 4 years duration / minor IWT level lessons Specialized teachers: guest experts	4 5 years duration Specialized teachers Low number of guest experts	4 4 years duration in most universities 1 to 4 semesters in Varna University of Economics Poor specialization and experience in IWT	6 3 to 3 ½ years Teachers with practical experience in IWT
Training centres / level of IWT in lessons	Not mentioned	Not mentioned	2 Romanian Maritime Centre with a high level of information in IWT	Not mentioned	Training in private schools or yacht clubs	5	1 Dunav Lloyd Company offers training courses for IWT employees
Master	0	0	0	0	0		0
E-Learning	Highly developed	Low developed Desired	Low developed Desired	Low developed Desired	Not mentioned Desired		Not mentioned
Curriculum at university level	• Transport modes important waterways and ports transport planning • Types of goods and ships	• Freighting • Logistics • logistic systems • logistic informatics • Operation of Ships, • Water Transport Control and Communication	• Transport management, • Transportation systems, • Navigation and ship • Manoeuvring the ship, • Law for IWT, • Theory of ship	• Comparison of transport modes, • Important waterways and ports, • Transport planning, • Types of goods and ships, • Market and	• Technical courses: Shipbuilding, Technology of Navigation, Technical Equipment of Ports, Mending and Maintenance of Vessels,	•	• Water transport technology • Technical and technological characteristics of inland waterways • Basic terms on water transport systems

	• Market and prices telematics in IWT	Systems, • Waterway Transport Informatics, • Waterway Transport Management • Waterways • Waterway Objects	construction, • Navigation electronics and electric instruments, • Transportation of goods, • Telematics in IWT, • Market and prices, • Standard languages for navigation	prices, • Navigation in the water transport, • Security inland, River informational services, • Ship manoeuvring, • Towing, • Pushing	Waterways and Ports, Science of Commodities. • Economic courses: Operation and Economy of Water Transport, Operation and Economy of Shipping Company. • Judicial courses: Sea and Inland Law		• Network of European waterways, rivers, regulation of rivers for sailing • Security aspects of inland waterways • Planning development of water transport - methodologies, studies

Table 7 shows that only university level education is organized in all countries. The two main problems of such education are:

- Low specialisation of the teachers (especially in practice); they have low or no background at all
- The curriculum contains minor to medium number of IWT lessons.

Regarding other types of education, the vocational school is organised in 3 countries and the high school, as well. The strong points of vocational and high school education are: specialised teachers and high number of IWT lessons which are missing at the university level as mentioned above.

The curricula are similar in 4 countries, small modifications only being necessary for the harmonisation process.

After the simple comparative analysis of the situation in the 7 countries a SWOT analysis was performed. Table 8 presents the results of that analysis.

Table 8

Strengths	Weaknesses
1. All vocational schools perform similar specialization lessons. 2. All vocational schools require large practice on ships or on simulators. 3. All vocational schools have experienced trainers and teachers.	1. The curricula are not up-dated and best adapted to the latest requirements. 2. Research and development are not specific and do no represent important objectives for the IWT schools and because of that schools are not promoters of new technologies. 3. The new applications from the field of the transportation smart systems (DGPS, AIS, ECDIS) are missing from current curricula. 4. No IWT integral school, that combines technical knowledge with commercial knowledge, is promoted.
Opportunities	**Threats**
1. There is the possibility to develop courses on logistics and on multimodal transportation in the IWT. 2. There is the possibility to increase the quality of the education by developing specific courses on the transportation smart systems (DGPS, AIS, ECDIS). 3. European Standard on the minimal education and qualification of the personnel can be elaborated and proposed. That can be done by using PLATINA-EDINNA projects. 4. Inland navigation university education can be developed in order to assure the research and development requirements.	1. There is a trend for the development of the logistics in the IWT, but outside the school system. 2. The research and development in the analysed field are accessed by other engineering specializations (software engineering, hardware engineering, hydro-weather forecasters, shipbuilders, hydro-technicians, electronics, etc.), because of a lack of optimum harmonisation of practice onboard ships with the engineering design. 3. Specialization of the teachers is difficult.

The answers to the questionnaires sent under the PLATINA project revealed that the managing decisional level (ML) on the ship is more important than the operational level (OL) which would point out the necessity of a psychological analysis of IWT human resources. The target is establishing the level of education: only vocational with optional university education or both together.

The performed short SWOT analysis reveals that existing schools (training centres, high schools, vocational schools) have a strong tradition in the IWT, but low mobility and flexibility in further development by using the new principles of technical and commercial knowledge.

8. Identification and exchange with other/ synergetic platforms

8.1 Exchange with PLATINA

Facts and Objectives

The FP7 project PLATINA - Platform for the implementation of NAIADES[1] supports the European Commission, Member States and third countries in the implementation of the NAIADES action program on the promotion of inland waterway transport[2].

Along with NAIADES one part of PLATINA is dealing with "Jobs & Skills". The main activities in this field are the establishment of a European nautical IWT Education Network, the elaboration of a lifelong learning initiative and the setup of a European IWT recruitment campaign[3]. The foundation of EDINNA (see next chapter) - the educational network of inland waterway (navigation) schools and training institutes – was strongly supported by PLATINA.

The figure 1 shows the correlations between:

- NAIADES: the European policy in the field of inland navigation
- PLATINA: the European platform for its implementation and
- NELI: an implementation project concerning the NAIADES action field "Jobs & Skills"

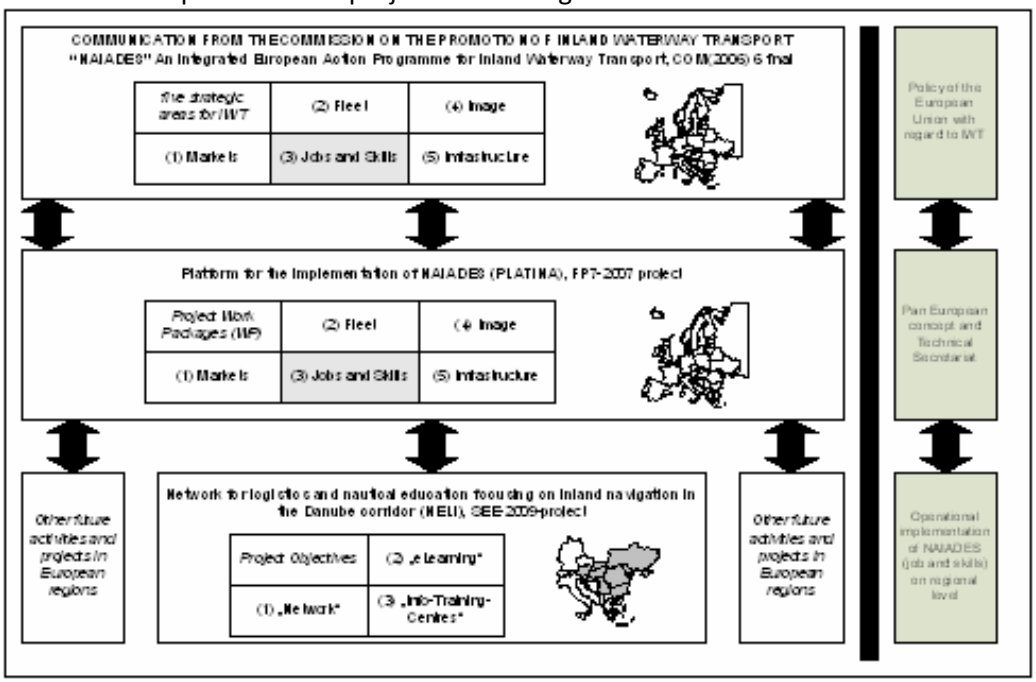


Figure 1 The correlations between projects

Organizational Structure

The organizational structure (figure 2) of PLATINA involves the following parties:

- **Steering Committee (SCOM):** responsible for the strategic guidance of the project's technical actions and recommendations. It consists of high-level representatives of Member States, third countries, river commissions, and the inland navigation industry as well as the European Commission. Their acceptance of PLATINA's results will be vital to the success of the NAIADES action program. The Steering Committee will usually

[1] More information on NAIADES and its implementation: www.naiades.info

[2] Information on FP7 project PLATINA: www.naiades.info/platina

[3] PLATINA working group on „Jobs & Skills": www.naiades.info/platina/page.php?id=9&path=12

meet every six months to review the roadmap reports proposed by the Management Committee.

- **Executive Board (Ex-Board):** made up of representatives of the European Commission and Work Package leaders. It is in charge of strategic planning, resolving contractual and financial issues.
- **Management Committee (MCOM):** consists of senior representatives of the Work Package leader organizations who are responsible for the tactical planning of the platform and its work packages. The Management Committee's task is to ensure a fair and equitable division of efforts between themselves and the project partners.
- **Technical Secretariat (TS):** responsible for the day-to-day administrative and technical management of PLATINA. It carries out the actions delegated by the Management Committee and the Executive Board. The Technical Secretariat will also be the focus point for the organization of the network and its dissemination and exploitation. This includes technical coordination and responsibility, coordination and liaison with the European Commission, financial administration, a communication desk, as well as a project back office.
- **Project partners:** experts who provide technical expertise and inputs to the various work packages and activities. These experts are chosen from inland navigation industry, consultants, promotion agencies and administrations.

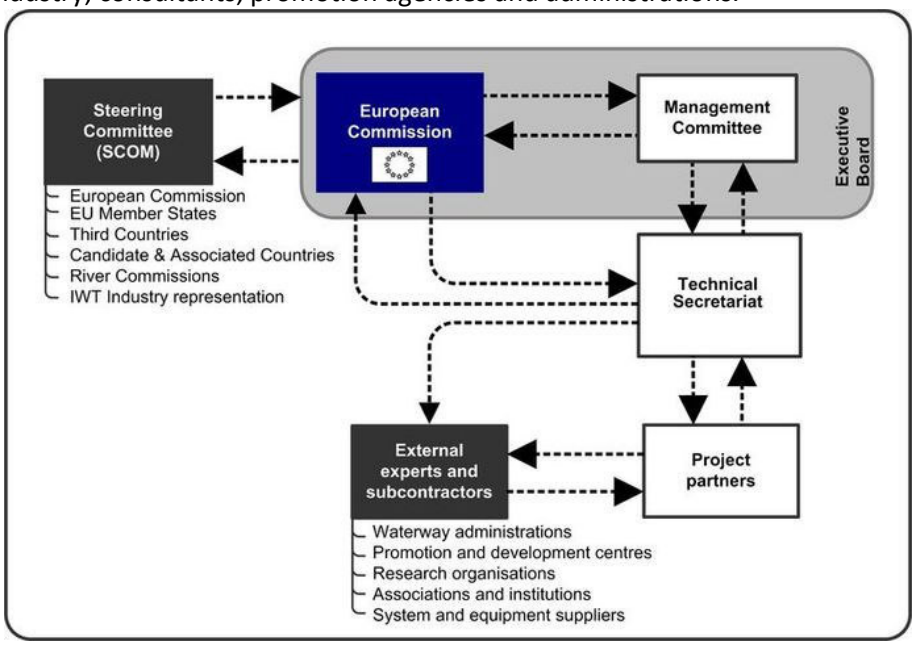


Figure 2 The organizational structure

Partners / Members

The PLATINA consortium consists of 22 project partners, organizations and authorities of the steering committee. The leader of PLATINA work package 3 is BDB (Bundesverband der Deutschen Binnenschifffahrt). In total there are 13 PLATINA partners involved in the PLATINA work package 3. Some of them are also partners in the NELI project (via donau - AT, RSOE – HU, CRUP – HR, CERONAV and IMST – RO). The other partners are mostly from Western Europe (adb – DE, vnf – FR, Promotie Binnenvaart Vlaanderen – BE, Promotie Binnenvaart Vlaanderen, STC and CBRB – NL, Romanian Intermodal Association).

Exchange carried out with NELI

As CERONAV is partner in and Via Donau is leader of PLATINA WP3 continual information took place abut NELI – already starting during the application phase. (e.g. at PLATINA WP3 meetings in February in Rotterdam, in June in Vienna and in September in Duisburg). In September there

were identified the first ideas of cooperation (e.g. exchange of E&T information, (contact) data and students/ teachers, dissemination of project results).

8.2 Exchange with EDINNA

Facts and Objectives

EDINNA is the educational network of inland waterway (navigation) schools and training institutes. The EDINNA association recognizes that all members use the same European waterway system and have a different background in various educational systems in Europe. It is the aim of EDINNA to come to a more structured cooperation and to establish a harmonized education, training and certification system for inland waterway personnel in order to ensure high quality of trained staff on board of the vessels. The bottom approach of EDINNA to international harmonize and cooperate on the level of schools is unique and forward-looking.
The EDINNA working program includes the following activities: besides dealing with organizational matters of the association itself, a strong focus lies on the aim of harmonizing European inland navigation education and training, also by looking closer at the use of training equipment and simulators. The educational network wants to focus on the Exchange Programs as well as the use of communication and language in the Inland Waterway Transport Sector.
In a very short time (EDINNA was officially funded in February 2009), EDINNA has become a new stakeholder in the inland navigation sector. Among other, EDINNA is the participant of the joint working group on professional competences in IWT with PLATINA, European Social Partners (EBU, ESO, ETF) and CCNR.

Organizational Structure

EDINNA is an Association along Dutch law. The EDINNA Board manages the daily business and represents the association. The Board (figure 3) consists of five members and meets at least twice per year. The board members are voted for a two year term.
Currently the board is assembled as it follows:

- **Chairman**: Mr. H.A.L. Arjen Mintjes - Director of the Maritime Academy (NL)
- **Vice Chairman**: Mr. Hans-Günter Portmann - Director of Schiffer-Berufskolleg RHEIN (DE)
- **Secretary and Treasurer**: Mr. Rob van Reem - Deputy Director of STC B.V. (NL)
- **Advisory officers**: Mr. Mihai Gheorghe Ghiba - University of Craiova (RO) and Mrs. Doina Munteanu - Director of CERONAV/ Galati (RO)

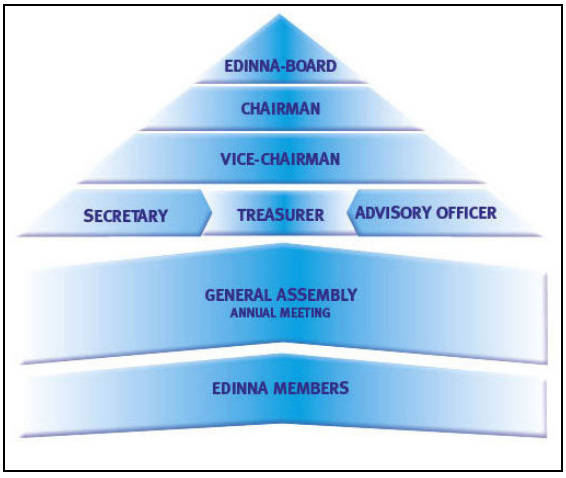


Figure 3 The organizational structure

Partners / Members

EDINNA has 20 members from 9 European countries. Two Bulgarian nautical schools are about to join soon. The educational and training institutions have different educational level (from secondary school to University). CERONAV, the University of Craiova (IMST), the Faculty of Transport and Traffic Sciences (Zagreb) and the Secondary school of shipping, shipbuilding and hydro building (Belgrade) are EDINNA members and NELI project partners.

Exchange carried out with NELI

As four EDINNA members are NELI project partner, mutual exchange of information is already taking place, for the work of NELI just started no detailed cooperation plans have been worked out yet. In order to meet the needs of the nautical education and training institutions and to assure the practical relevance of activities like 3.2 (three harmonized teaching topics) and 4.2 (eLearning content), the input and feedback of EDINNA members are very important. The better the cooperation and exchange works, the more NELI outputs will be used by the (nautical) E&T sector.

8.3 Exchange with IPTC

Facts and objectives

IPTC started in 1970 as a group of port training institutes with a view of exchanging information and views on port worker training in relation to the technological development in ports. The decision was then taken to organize a similar conference every two years in different European countries. During the conferences, there were discussed subject matters linked to the education and training of port personnel at all levels. The main objective was to raise the awareness of the people working in this sector that training of human resources is vital in port evolution. Later on, international organizations such as ILO (International Labour Organization), UNCTAD (United Nations Conference for Trade and Development), IAPH (International Association of Ports and Harbours), ESCAP (Economic and Social Commission for Asia and the Pacific) started to contribute to the efforts of the IPTC members. Along the time IPTC identified the education and training requirements dictated by the technological and environmental changes and monitored the impact of new shipping technologies and transport logistics on port training (introduction of structural learning programmes, computer aided learning, development of standardized training by the introduction of simulator training and other teaching aids, preoccupation for other educational possibilities such as vocational schools, emergence of training institutions in port related sectors). By the end of the 90's, IPTC was already talking about the globalization of the HR development, multipurpose functions in the transport industry, interaction between education institutes and companies, web-based port training and continued with the long distance learning through internet and e-mail (TRAINMAR experience), modularized training, skills development, enterprise flexibility. IPTC members became more preoccupied with the comparative analysis of workers competences and a communication strategy to attract more young people to port training and education.
In recent years the IPTC members have recognized the importance of the modal shift because of the road congestion and environmental restrictions and turned their attention to inland waterway transport. The STC Group - Shipping and Transport College in Rotterdam, the promoter and constant supporting actor of IPTC, became more and more involved in the education and training of inland navigation personnel and in the development of quality training materials to be shared among the companies and education institutions.

Organizational structure

IPTC is a bi-annual meeting of experts in the field of Human Resources Development and Training in the port environment. IPTC is managed and coordinated by an Honorary Secretary,

an Executive Secretary and a Steering Committee of 6 members, all working voluntarily. The Shipping and Transport College (STC) of Rotterdam supports the work of the Secretariat.

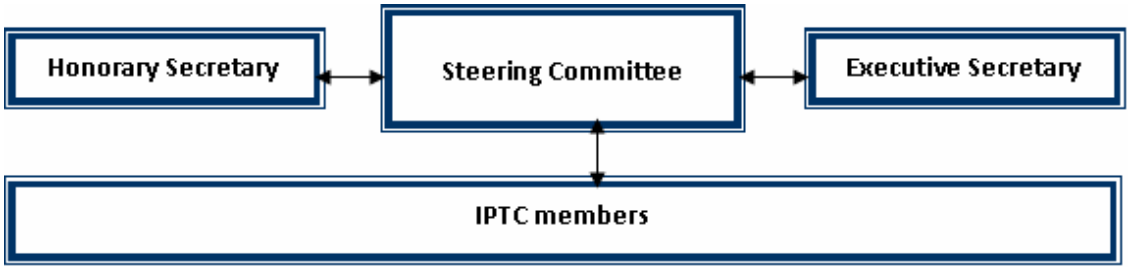


Figure 4 Organizational Structure

Partners/ Members

International and national training providers, consultants, human resource specialists as well as representatives of global terminal, transport and logistics sectors from 50 states all over the world are participating in the IPTC.

Exchange carried out with NELI

Exchange of information and experience between NELI and IPTC is currently being made through the interaction of the two NELI partners - CERONAV (RO) and via Donau (AT) – with the STC Group, which is also a member of EDINNA Association. EDINNA acts as a background platform for the cooperation between NELI and IPTC. Both NELI and IPTC are interested in reducing the skill gap at all levels of labour force. Their common view is that training should reflect that the transport industry is a complex process and workers should be aware of the interdependency of operations.

9. Conclusions

Answers received to the questionnaire showed there is an interest in acquiring more information and developing new teaching materials on IWT-related issues. The network has to give the possibility to supply the teachers/ lecturers/ trainers with adequate information and raise awareness in IWT. Keeping in contact with them (e.g. invite them to IWT events, Negrelli – floating exhibition, Ennshafen and Galati ITCs) means:

- Offering materials (e.g. Manual on Danube Navigation, maps with waterways and ports, and others);
- Offering train-the-trainer courses for INeS Danube;
- Offering guest lectures;
- Offering IWT internships (ports, shipping companies, IWT administration).

The identification work and subsequent analysis of replies received to questionnaires sent offered, apart from an overall picture of status of education in IWT, valuable information and guidelines for future operation of the NELI network.

10. Annexes

Annex 1 – Questionnaire
Annex 2 – Centralized data on the identified IWT E&T institutions

ANNEX 4: INTERVIEW PARTNERS

The following list gives an overview of the interview partners for the requirement analyses. Interview partners that did not want to be named in the study are marked as anonymous.

IWT EDU	Inland Waterway Transport Educational Institution
PVO	Passenger Vessel Operator
CVO	Cargo Vessel Operator
Admin	Administrative Body
Others	Other company or institution

Austria

Company	Type				
	IWT EDU	PVO	CVO	Admin	Others
DTSG Donau Tankschiffahrts GmbH			x		
DDSG Blue Danube GmbH		x			
Vocational School for Machine and Production Technology – Inland Navigation	x				
Croisi Europe		x			
Ministry for Transport, Innovation and Technology; Department navigation - technical and nautical affairs				x	

Slovakia

Company	Type				
	IWT EDU	PVO	CVO	Admin	Others
University of Zilina, Department of Water Transport	X				
Anonymous administrative body				X	
Slovak Shipping and Ports			X		
Anonymous administrative body				X	
Tatra Marine			X		
Waterborne Transport Development Agency Slovakia				X	

Hungary

Company	Type				
	IWT EDU	PVO	CVO	Admin	Others
Fluvius Schifffahrts und Speditions GmbH			X		
Magyar Hajózási Szakközépiskola - Hungarian Navigation Secondary School	X				
Dél-Balatoni Idegenforgalmi, Közgazdasági Szakközépiskola - South Balaton Secondary School	X				
National Transport Authority				X	
Anonymous Cargo Vessel Operator			X		
Wiking		X			
Zoltán Gőzös Közhasznú Alapítvány Hajósakadémia	X				

Croatia

Company	Type				
	IWT EDU	PVO	CVO	Admin	Others
Faculty of Transport and Traffic Sciences (FPZ)	X				
The Danube Lloyd			X		
Secondary Vocational School of Trade Sisak	X				
Brodocentar Sisak d.o.o.	X				

Serbia

Company	Type				
	IWT EDU	PVO	CVO	Admin	Others
SBBH - School of shipping, shipbuilding and hydrobuiling	X				
Traffic school PINKI	X				
Jugoslovensko Rečno Brodarstvo - Yugoslav river shipping company				X	

Romania

Company	Type				
	IWT EDU	PVO	CVO	Admin	Others
Sever Trans			X		
AFDJ RA Galati				X	
PIMM Galati/ Sanara SRL					X
Port Bazinul Nou; S.A. Galati					X
SC Maritime Solutions Galati					X
Union of Romanian Inland Ports					X
Romanel International Group			X		
Anonymous Shipyard					X
Anonymous Other Company					X
A.A.O.P.F. Romania - Galati			X		
Romanian Naval Authority				X	
Zona Libera Galati (Free Zone)					X
CNFR Navrom					
Anonymous Other Company					X
Colegiul Tehnologic de Marina Galati	X				

Prodprest Galati					X
Dunarea de Jos University Galati	X				
IMST - University of Craiova	X				
Colegiul Tehnologic de Marina "A.I. Cuza" Constanta	X				
CERONAV	X				
River Captain on School Ship North Star	X				

Bulgaria

Company	Type				
	IWT EDU	PVO	CVO	Admin	Others
Anonymous Cargo Vessel Operator			X		
Anonymous Cargo Vessel Operator			X		
Anonymous IWT Educational Institution	X				
Moryashki Tsentar - Ruse LTD	X				
Anonymous Cargo Vessel Operator			X		

ANNEX 5: FURTHER EVALUATION OF QUESTIONNAIRE

Organisation of Danube School Ship

Country	New E&T institution	Common used ship for existing institutions
Austria	25%	75%
Slovakia	50%	50%
Hungary	50%	50%
Croatia	0%	100%
Serbia	0%	100%
Romania	79%	37%
Bulgaria	0%	100%
Ukraine	n.a.	n.a.
Average	29%	73%

Vessel Type 1

Country	Pushed Convoy	Motor cargo/ passenger vessel	Tankship (dangerous goods)	Motor cargo/ passenger vessel + barge(s)
Austria	50%	50%	0%	25%
Slovakia	40%	40%	0%	20%
Hungary	0%	20%	0%	80%
Croatia	50%	25%	0%	25%
Serbia	0%	100%	0%	0%
Romania	52%	29%	19%	62%
Bulgaria	20%	40%	0%	40%
Ukraine	n.a.	n.a.	n.a.	n.a.
Average	30%	43%	3%	36%

Vessel Type 2

Country	Reconstructed passenger ship	Reconstructed motor cargo vessel	Reconstructed Pusher	New/special School Ship construction	School barge attached to an operating convoy *	Other
Austria	25%	75%	50%	50%	75%	0%
Slovakia	0%	75%	50%	0%	0%	0%
Hungary	66%	66%	0%	100%		
Croatia	50%	0%	0%	50%	0%	0%
Serbia	0%	33%	33%	33%	0%	0%
Romania	10%	19%	24%	81%	24%	0%
Bulgaria	0%	40%	0%	60%	0%	0%
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Average	22%	44%	22%	53%	16%	0%

** not possible due to legal reasons*

Facilities on board

Country	Dedicated teaching room	Accommodation area	Engine Workshop	Kitchen and recreation area
Austria	100%	100%	50%	100%
Slovakia	100%	66%	66%	66%
Hungary				
Croatia	100%	50%	100%	75%
Serbia	33%	100%	100%	66%
Romania	95%	67%	90%	57%
Bulgaria	40%	100%	0%	100%
Ukraine	n.a.	n.a.	n.a.	n.a.
Average	67%	69%	58%	66%

Others:
-) Sanitary facilities
-) Accommodation
-) PC in the cabine
-) Fitness area
-) Cook on board
-) Training laboratory & special room for management situations
-) Wheelhouse connected to internet and RIS network

Estimated Capacity of Vessel

Country	Capacity
Austria	10 - 30
Slovakia	10 - 24
Hungary	15 - 30
Croatia	10 - 15
Serbia	5 - 15
Romania	10 - 50
Bulgaria	18 - 20
Ukraine	n.a.
Average	5 - 50

User Groups

Country	Apprentices (dual education system)	Carreer changers	Practitioners	Students (with little practical experience in their education)	Estimated # of users	Estimated usage time
Austria	100%	100%	100%	75%	25 users	3 months
Slovakia	60%	80%	20%	60%	30 - 40 users	3 to 5 months
Hungary	100%	83%	83%	67%	50 - 70 users (+ 50-60 hotel crew)	7 to 13 weeks
Croatia	100%	50%	25%	75%	45 - 65 users	4 to 5 months
Serbia	0%	33%	0%	100%	min. 110 users	5 months
Romania	67%	48%	48%	67%	several hundred users	whole year
Bulgaria	80%	40%	60%	60%	160 - 260 users	3 to 5 months
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Average	72%	62%	48%	72%		

Simulators on board

Country	No	Yes	If yes, which ...					
			Ship handling simulator	Radar simulator	Cargo handling simulator	Engine room simulator	Radio simulator	Inland ECDIS
Austria	50%	50%	100%	100%	100%	100%	100%	100%
Slovakia	60%	40%	50%	50%	0%	0%	0%	50%
Hungary	33%	66%	100%	100%	0%	0%	75%	100%
Croatia	50%	50%	100%	100%	50%	50%	50%	100%
Serbia	100%	0%	0%	0%	0%	0%	0%	0%
Romania	32%	68%	100%	73%	53%	80%	40%	33%
Bulgaria	40%	60%	100%	50%	50%	0%	0%	100%
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Average	52%	48%	79%	68%	36%	33%	38%	69%

Further Education on the ship

Country	No	Yes - national language	Yes - English language
Austria	0%	100%	75%
Slovakia	20%	75%	50%
Hungary	0%	50%	100%
Croatia	0%	75%	50%
Serbia	0%	100%	0%
Romania	10%	60%	75%
Bulgaria	20%	80%	20%
Ukraine	n.a.	n.a.	n.a.
Average	7%	77%	53%

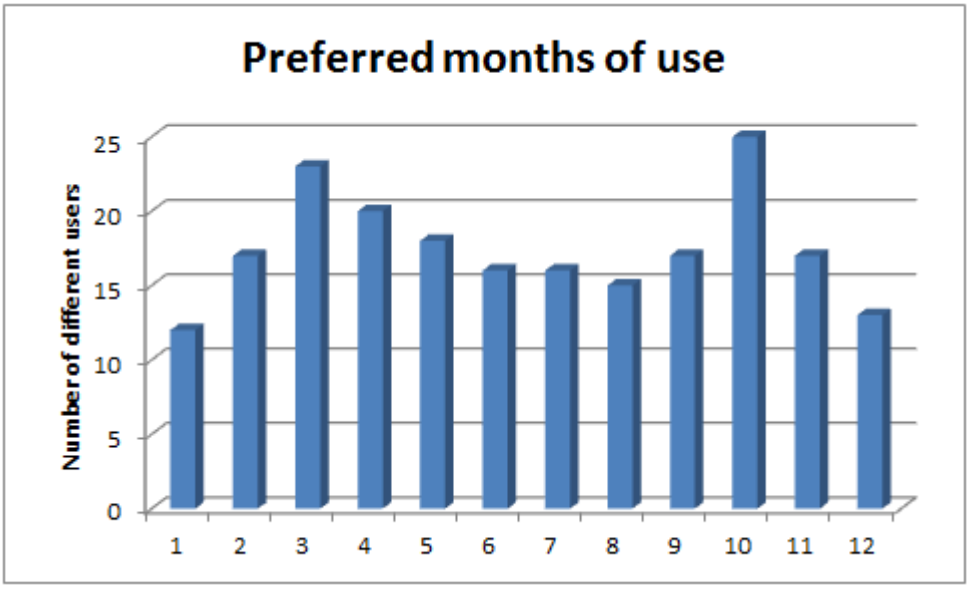
Tour

Country	Range			Composition	
	Only national tours	International tours	National &international tours	Only national team	Mixed Team
Austria	0%	100%	0%	0%	100%
Slovakia	0%	100%	0%	0%	100%
Hungary	20%	40%	40%	0%	100%
Croatia	50%	50%	0%	66%	33%
Serbia	33%	67%	0%	33%	67%
Romania	53%	16%	31%	45%	55%
Bulgaria	40%	60%	0%	100%	0%
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.
Average	28%	62%	10%	35%	65%

Preferred months of use

number of different users

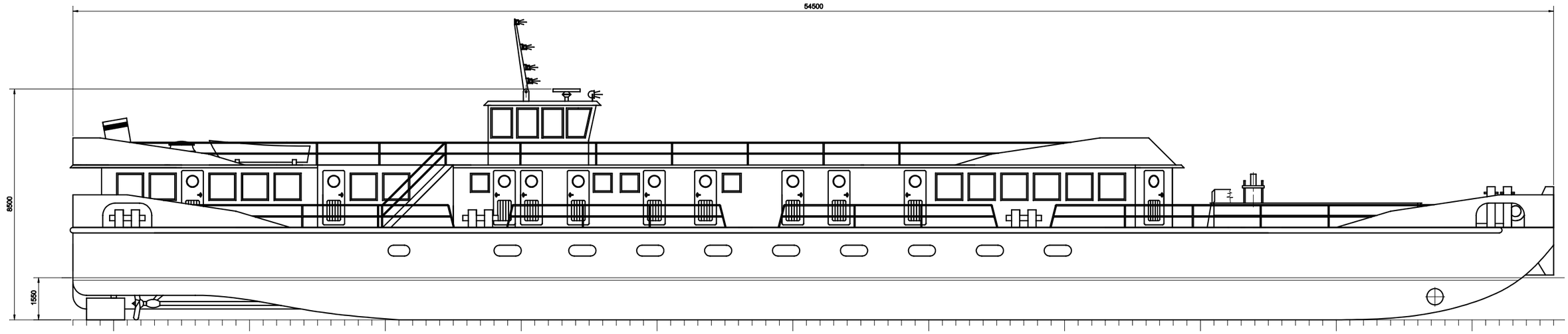
Country	1	2	3	4	5	6	7	8	9	10	11	12
Austria	1	3	3	3	0	0	0	0	0	2	3	3
Slovakia	0	0	1	1	2	1	0	0	1	3	1	0
Hungary	3	4	5	5	5	5	5	5	5	5	4	3
Croatia	0	0	1	1	2	1	0	0	1	3	1	0
Serbia	0	0	1	1	2	1	0	0	1	3	1	0
Romania	3	5	8	7	5	7	10	9	8	7	2	2
Bulgaria	5	5	4	2	2	1	1	1	1	2	5	5
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Overall	12	17	23	20	18	16	16	15	17	25	17	13

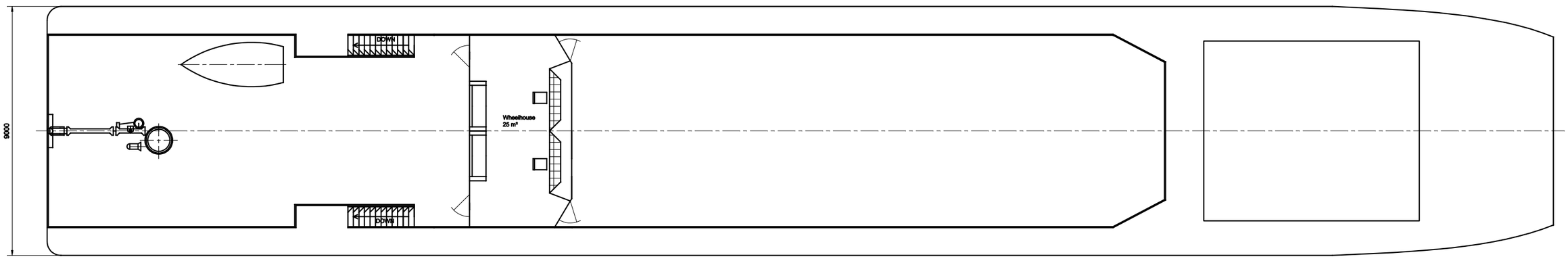


Financing

Country	Make use of the ship		Participation in international association		Financial Contribution	
	Yes	No	Yes	No	Yes	No
Austria	3	1	2	2	1	3
Slovakia	3	2	1	4	1	4
Hungary	5	1	3	3	2	3
Croatia	4	0	3	1	1	1
Serbia	3	0	2	1	2	1
Romania	17	2	15	4	7	12
Bulgaria	3	2	4	1	1	4
Ukraine	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Overall	38	8	30	16	15	28

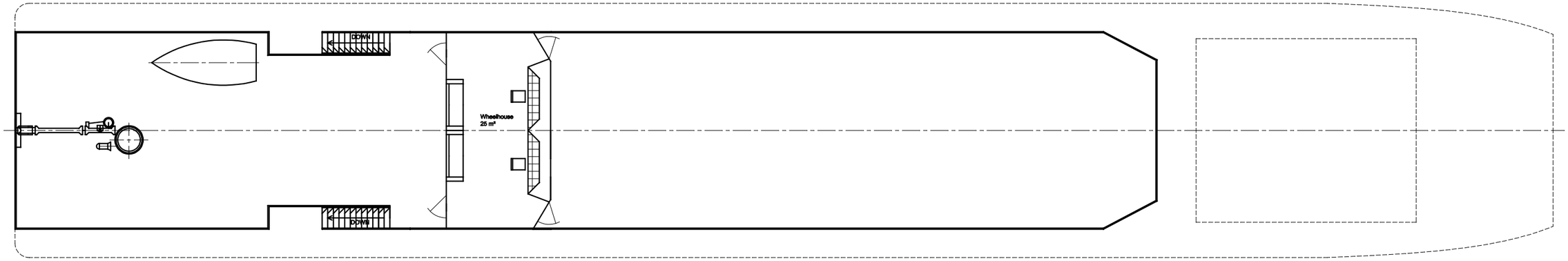
ANNEX 6A: VESSEL DESIGN WITH FIXED WHEELHOUSE



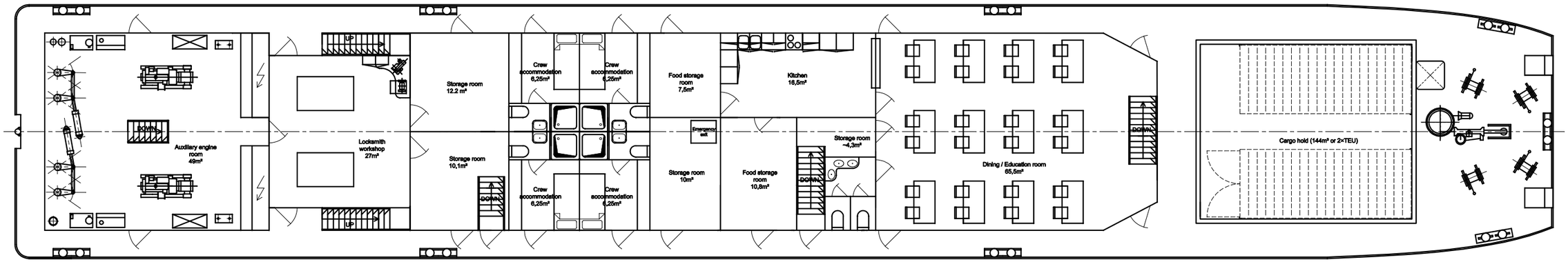


Loa = 54.5m
Lwl = 52.9m
B = 9m
T = 1.55m
H = 8.5m
V = 488 t

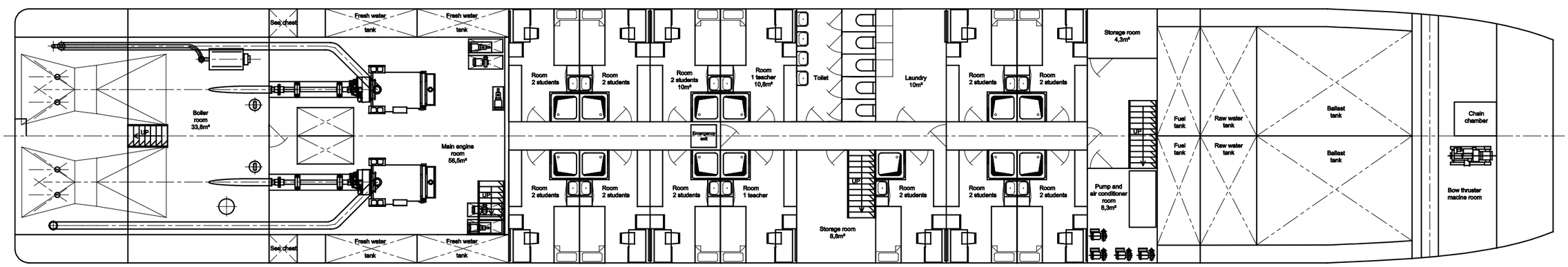
HINT project Act.4.2. Danube School Ship Concept	Danube School Ship with fixed wheelhouse	Scale: M 1:150 (A3)
	General arrangement	Date: 05.05.2014



Sun deck



Main deck

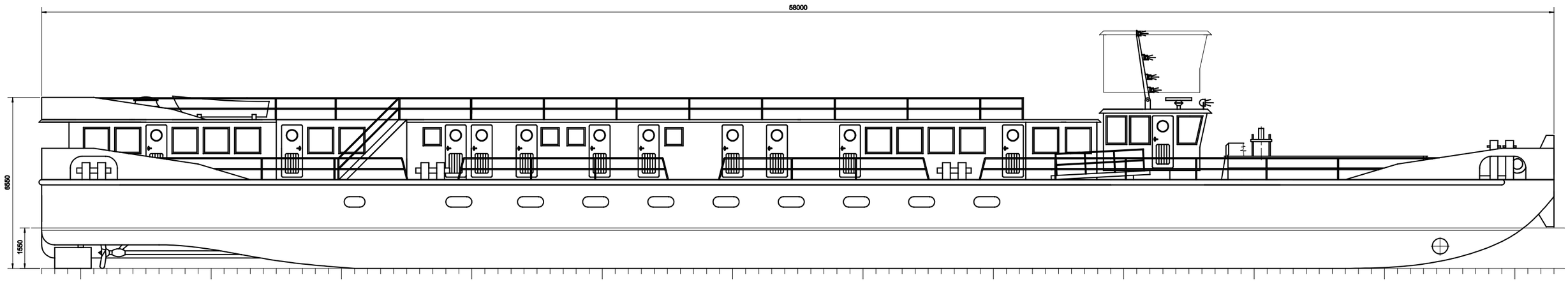


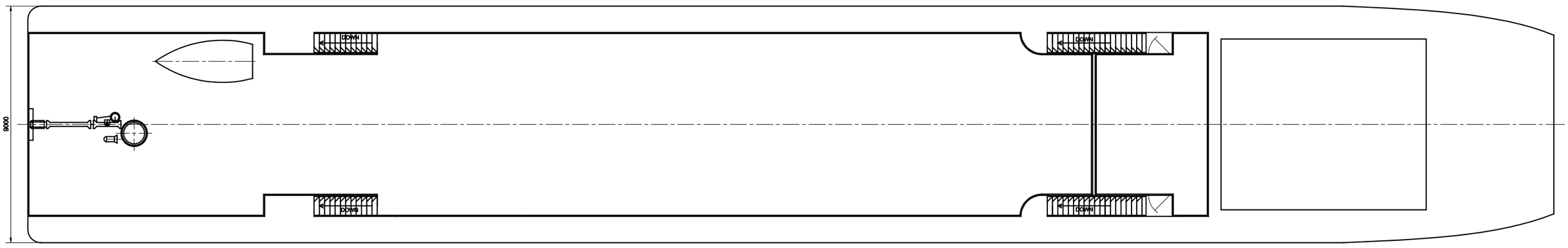
Lower deck

Loa = 54.5m
Lwl = 52.9m
B = 9m
T = 1.55m
H = 8.5m
V = 488 t

HINT project Act.4.2. Danube School Ship Concept	Danube School Ship with fixed wheelhouse	Scale: M 1:150 (A3)
	Deck arrangements	Date: 05.05.2014

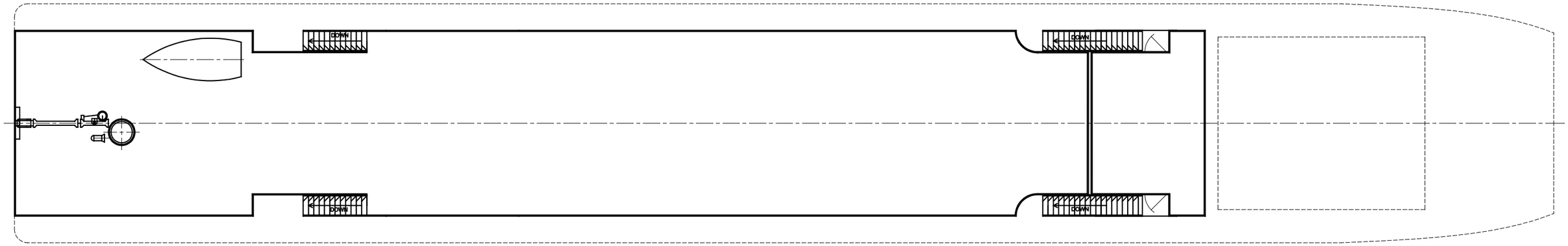
ANNEX 6B: VESSEL DESIGN WITH LIFTING WHEELHOUSE



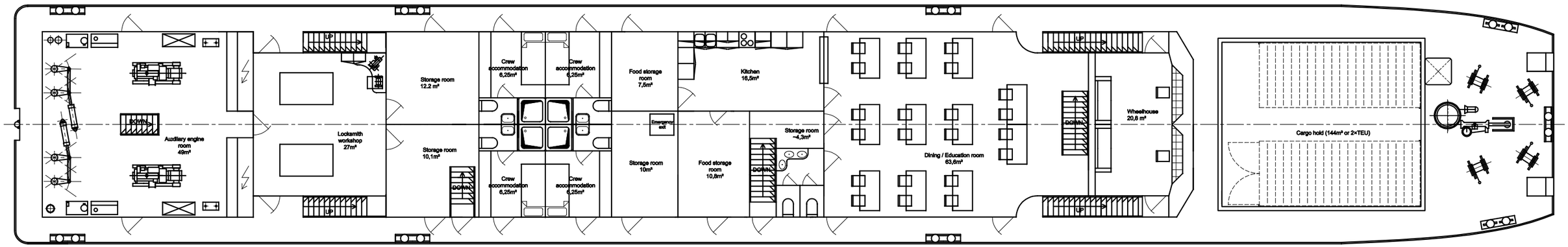


Loa = 58 m
Lwl = 56.4 m
B = 9 m
T = 1.55 m
H = 6.55 m
V = 519 t

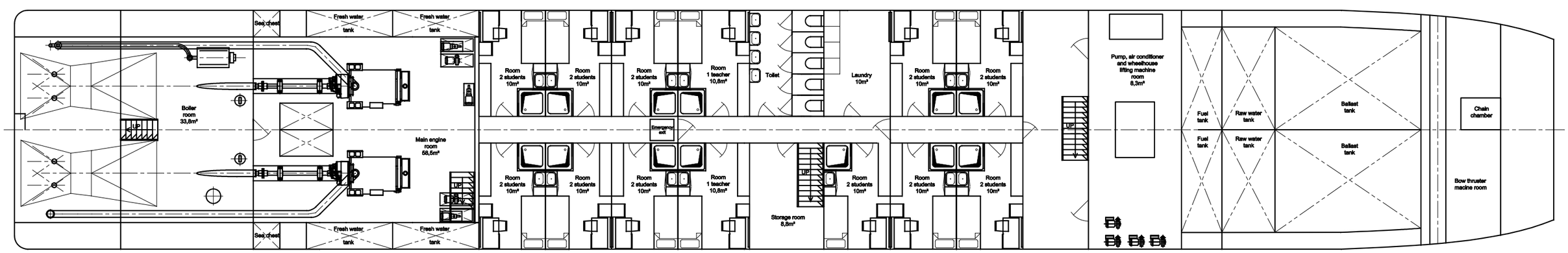
HINT project Act.4.2. Danube School Ship Concept	Danube School Ship with lifting wheelhouse	Scale: M 1:150 (A3)
	General arrangement	Date: 05.05.2014



Sun deck



Main deck



Lower deck

Loa = 58 m
Lwl = 56.4 m
B = 9 m
T = 1.55 m
H = 6.55 m
V = 519 t

HINT project Act.4.2. Danube School Ship Concept	Danube School Ship with lifting wheelhouse	Scale: M 1:150 (A3)
	Deck arrangements	Date: 05.05.2014