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Ship Lifecycle Software Solutions (SHIPLYS)

Project Deliverable Report

D9.4 Initial Exploitation and Business Plan

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EXECUTIVE SUMMARY

The SHIPLYS project aims to offer an innovative ship design tool to be used by European SMEs in the ship industry. Through integrated modelling with life cycling approach will provide to its users the necessary tools for Life Cycle Cost Analysis (LCCA), environmental assessments, risk assessments and end-of-life considerations.

One of the first tasks in the project, as part of the WP9, is the development of an initial business plan for the commercial exploitation of the SHIPLYS software that will be delivered at the end of the 3-year period of the project.

Deliverable D9.4 will present an overview of the initial business plan and exploitation activities developed for the tools created inside the SHIPLYS project and the challenges faced. Initially the business plan will be based on the Grant Agreement's requirements and will be updated with all the developments inside the project's work packages. Therefore, the deliverable can be considered as a general description of a suitable business plan for the business exploitation of the SHIPYS tools and it will be continuously updated until the end of the project[1]. A comprehensive business plan will be of interest to all beneficiaries of the commercial exploitation of the SHIPLYS tools.

The initial business plan will present the first attempt for the development of a working market strategy for the business exploitation of the SHIPLYS tools and it will be described according to the specifications delivered by the Grant Agreement of the project. As part of the market strategy, the targeted market will be presented in economic terms and the potential competition will be analysed. Additionally, the key inputs for the development of a competitive ship design tool and a successful market entry will be explored.

Furthermore, an overview of different potential business models to be used for the commercialisation of the software will be presented along with sale and promotional activities for an effective market strategy plan.

Finally, a number of financial tools and economic ratios will be used to evaluate the investment and forecast the economic results of the new company, based on assumptions and information available at the beginning of this effort.

[1] Developments on business exploitation of the SHIPLYS tool will be presented in the deliverable D9.5: 'Final exploitation and business plan'

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Bn	Billion
CAD	Computer Aided Designing
CAE	Computer Aided Engineering
CAM	Computer Aided Machining
CESA	Community of European Shipyards` Associations
CFD	Computational Fluid Dynamics
DoW	Description of Work
ERP	Enterprise Resource Planning
EU	European Union
FE	Finite Element
FEA	Finite Element Analysis
FEM	Finite Element Model
GDP	Gross Domestic Product
IACS	International Association of Classification Societies
IGES	Initial Graphics Exchange Specification
IP	Intellectual Property
IRR	Internal Rate of Return
LCC	Life Cycle Cost
LCCA	Life Cycle Cost Assessment
LCT	Life Cycle Tool
MPV	Multi Purpose Vessel
MRP	Manufacturing Resource Planning
NPV	Net Present Value
O&M	Operation & Maintenance
PEDR	Professional Experience Development Record
PLM	Product Lifecycle Management
QFD	Quality Function Deployment
R&D	Research and Development

ROI	Return On Investment
SAC	Stakeholders' Advisory Committee
SEO	Search Engine Optimisation
SHIPLYS	Ship Lifecycle Software Solutions (EU project)
SME	Small and Medium-sized Enterprises
STEP	Standard for the Exchange of Product model data
SW	Software
SWOT	Strengths, Weaknesses, Opportunities and Threats

1 Introduction

About SHIPLYS

Ship Lifecycle Software Solutions (SHIPLYS) is a three-year research project that started in September 2016. The main objective of the project is to develop a software tool that will include rapid virtual prototyping processes of the early ship design together with performing a life cycle cost analysis (LCCA) of the developed ship design as well as an environmental assessment, risk assessment and end-of-life considerations.

The SHIPLYS project has been led by a consortium of maritime industry members composed by three (3) shipyard clients, three (3) universities, one (1) naval architect firm, two (2) supply chain solution suppliers, two (2) industrial R&D institutions and one (1) standards and validation body, joined with a goal to reduce ship building time and production cost, while improving energy efficiency. The consortium expertise will contribute to the development of a competitive and high performance product and will provide input to certain management decision subjects.

The project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 690770. The maximum grant amount for the development period is estimated at 6.144.150, 00 € and it reimburses 70% - 100% of the action's eligible costs.

The SHIPLYS final product is planned to be delivered by September 2019.

Problem it addresses

The SHIPLYS project is developed in response to needs of SME naval architects, shipbuilders and ship-owners, who, in order to survive in the world market, need to improve their capabilities and reduce the time and costs of design and production, to be able to reliably produce better ship concepts through rapid virtual prototyping and meet the increasing requirements for LCCA (Life Cycle Cost Analysis), environmental assessments, risk assessments and end-of-life considerations as differentiators.

The calculation and modelling to achieve the functionalities required are difficult and time consuming, especially for SMEs without a large overhead of trained staff and tools. This is due to challenges in integrating data between incompatible tools and formats for different design stages: conceptual hull design; the finite element calculations feeding preliminary and detailed designs; and virtual prototyping simulation models. This is coupled with the lack of an industry specific lifecycle modelling technique, hindered by the lack of information to support reliable decision-making. SHIPLYS aims to address these challenges for the benefit of various stakeholders involved.

Aims & objectives of the presented business plan

The initial exploitation and business plan deliverable D9.4, which will be developed at an early stage of the SHIPLYS project in liaison with all partners, will provide the guidelines for the introduction of the developed product to the ship design software tools market with the analysis of the specific market and the use of various exploitation and marketing activities for the commercialisation of the SHIPLYS tool. The market analysis will include establishment of targets, market segments, and investment environment, while the exploitation activities will also cover the 3 year period of the project's life.

The exploitation activities of the SHIPLYS project are a critical and essential activity for the project and all partners will play an active role in the development of a dynamic market strategy plan.

Specialist design software companies, naval architectures, shipyards and ship owners across Europe will be approached for the dissemination of the SHIPLYS product tool.

2 SHIPLYS software tool

2.1 About the tool

The SHIPLYS software will be an integrated design platform to facilitate ship design process within the context of LCA by creating virtual prototyping and life cycle tools, to be used by European SMEs in ship industry. It will be able to deliver modern ship design solutions (3D modelling), perform retrofitting techniques to existing ship and provide estimations on life cycle costs (LCC) and the environmental footprint of the ship's construction, operation, maintenance and dismantling. Additionally, it will be able to optimise the ship design procedures, evaluate the process and compare different approaches.

Details of the developed tools will be presented in the various tasks of the SHIPLYS project.

2.2 Tool development phases

2.2.1 Product R&D and testing

SHIPLYS aims to build on existing experience in the shipping sector, and transfer experience from the development of life cycle modelling and rapid virtual prototyping in other industry sectors. Key tasks in the project include:

- The development of LCCA, environmental and risk assessment software modules for fast and cost effective evaluation of alternatives
- The integration of such modules with rapid early design and production simulation tools
- The development of multi-criterion decision analysis techniques to support decision making across the short/ long term, based on explicit user defined decision criteria.

In order for the project to fulfil its objectives, a number of work tasks have been created. One of the first tasks is the development of various scenarios by the stakeholders in order to test the functionalities of the SHIPLYS tools. The scenarios that qualified through the evaluation process are presented briefly below[2]:

- Scenarios 1: Hybrid propulsion of a short route ferry [Ferguson Marine (FERG) and University of Strathclyde (USTRATH)]

This scenario aims to optimise the design of a short-route ferry (domestic voyages) using a novel hybrid propulsion system, which combines internal combustion engines and battery cells. A hybrid propulsion system is Diesel-Electric (D-E) as opposed to the conventional Diesel-Mechanical (D-M). Carrying out an analysis for this scenario will cover the whole life cycle of the ferry, including design and production, operation and maintenance and scrapping and recycle stages. In each stage, cost analysis, environmental impacts and risk assessments will be considered.

- Scenario 2: Conceptual ship design of a MPV vessel accounting for risk-based LCA [Varna Maritime (VARNA), Instituto Superior Técnico (IST) and Atlantec Enterprise Solutions (AES)]

A conceptual design of a new Multi-Purpose Vessel (MPV) will be carried out within the environment of an SME shipyard, accounting for the shipyard's constraints in terms of engineering specification, construction and operational costs and will use technologies embedded in existing software applications and in the SHIPLYS software tool to be developed. The procedure involves ship design and optimisation in terms of naval architecture (main ship dimensions) and marine engineering systems design employing a risk-based LCA, including risk-based structural design, operation and maintenance (O&M)

[2] The scenarios are presented thoroughly in the deliverable D2.1: Selected scenarios and the rationale for such selection

optimisation, greener design for environmental impact, retrofitting options and end-of-life decommissioning. In parallel to the conceptional design, fast hull prototyping and production assessment will be carried out approaching the shift of an SME shipyard from a mainly repair functionality to a new-construction functionality, with a capacity to build new ships.

- Scenario 3: Retrofit or repair works [Astilleros de Santander (ATD) and SOERMAR]

This scenario intends to support a repair shipyard during the bid-stage to optimise retrofitting design and production and to arrive at realistic costs. The scenario includes the calculation of Life Cycle Cost (LCC), performance of Life Cycle Assessment (LCA) and Risk Assessment (RA), which will quantify the overall cost and impact of the retrofit/repair works (e.g. scrubbers and/or ballast treatment installation) during the project implementation.

- Scenario 4: Optimising shipyard production systems [Atlantec Enterprise Solutions (AES)]

Purpose of this scenario is to optimise the shipyard's production system in response to changing demands. Production optimisation will include transforming to a new vessel type portfolio, which for example necessitates use of thin sheet materials, which in turn need new or updated methods for cutting and welding. An additional consideration will be that where the shipyard moves to a modular construction concept, where as much as possible standard assemblies of the ship are manufactured. Return of Investment (ROI) will be calculated, given forecasts relating to future applications of this scenario. Production optimisation is a strand that is potentially part of the other scenarios too. This is understandable as production is included in life cycle costs.

Next to the scenarios development, the requirements for integration of the rapid virtual prototyping and life cycle tools will be specified. Data quality assessment and database development will be performed and models for LCCA, environmental assessment, risk assessment and multi-criteria decision making will be developed. Furthermore, rapid virtual design and production process prototyping generators will be implement.

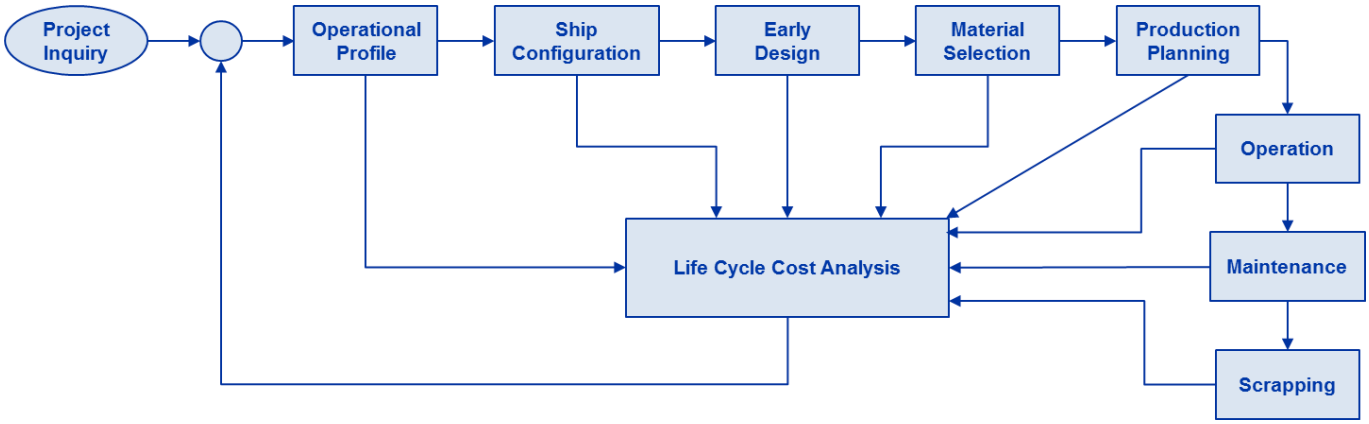

Figure 1: SHIPLYS tool overview

The rapid virtual prototyping modules and SHIPLYS LCT, and their adaptation for the development of generic models will be integrated and optimised. Testing, demonstration, verification and development of good practice guidelines will be included.

Furthermore, a dissemination plan and a business plan will be developed and implemented, and software training will be provided.

One of the first steps in the development of a product is the analysis of the market in which the developed tools will be launched. Continuous monitoring of the market will provide additional information for the developing process. Additionally, the architecture of the developed product will be determined in

accordance with the market analysis information (software environment, web based, databases etc.). The SHIPLYS tools will be formatted as software and general databases will be created in which all licenced users will have access. Databases along with additional data provided by the users will be locally hosted. The ship design software will present a 3D design and an illustration of the mid-ship section of the proposed ship.

As mentioned before, the Scenarios presented here (and presented in more detail in D2.1) are the ones that are being considered by the Consortium for the development of the SHIPLYS set of software solutions. At the time of writing this report, the consensus within the SHIPLYS consortium is that optimising shipyard production systems are crucial activites included in Scenarios 1, 2 and 3. Therefore, rather than treat production system optimisation as a separate Scenario, we envisage this functionality to be developed using, in varying extent, Scenarios 1, 2 and 3, particularly those Scenarios where relevant data for software development is made available.

2.2.2 Product commercialisation and exploitation

The project's Grant Agreement designates initial exploitation of the SHIPLYS results.

The specific exploitable project results are foreseen as being:

- Virtual prototyping methodology that integrates with lifecycle predictions
- Data interoperability standard format definitions, compatible with the ISO Application Protocols
- Life cycle cost analysis (LCCA) module, environmental assessment module enabling Life Cycle Assessments (LCA), risk assessment module and the decision support module all integrated and tailored for ship building application
- Database architecture and initial population for shipbuilding product model builds
- Methodology for data quality evaluation and optimisation, to increase the database effectiveness over time.

All project partners are obligated to exploit the results and exploitation agreement will be created in the form of potential licence agreement, described in PEDR and the Consortium Agreement.

It is proposed to introduce SHIPLYS software tool initially into a carefully selected group of partners within SME shipyards and their design supply chains, in order to build a base for a full-scale rollout in the intermediate term (5 years). These SME partners may be offered preferential payment terms, or potentially hire-purchase or rental terms, in exchange for providing early adopter stance, information capture and publicity from their operations. One key focus will be on the service offering (installation, maintenance, training etc.) to ensure a high level of satisfaction among the first set of customers to build a word-of-mouth reputation.

The initial installation of the software to an affirmation group (5-10 installations) will lead to the growth of sales out into European commercial markets through strategic conversion of the opportunities identified in the market setup work. The next sale activities will target those potential partners that could not take up the initial offer, due to wrong timing in their development cycles or other factors such as financial problems.

Lastly, a wide market strategy plan will be designed in order to reach more potential customers of the shipping community and achieve the goals that will be set by the corporate organisation exploiting the SHIPLYS software.

3 Market analysis

3.1 Target market

What is the target market

As a first step, the targeted group of potential customers must be established. SHIPLYS, as stated in the project`s DoW, is aimed at European SME shipyards and design offices, but can also be of interest for the scientific community and several other parties. Main efforts will be focused on engaging with them, soliciting feedback and being guided by their requirements.

The following section brings an overview of all target market members.

1. Industry – PRIMARY TARGET

   Industry partners include European SME shipyards and design offices, presenting the primary target market for the developed SHIPLYS software.

   When reviewing the SHIPLYS project in particular, several consortium partners represent a direct link to the rest of the European shipyard and design office market since they are its important members. A direct link to the primary target market is also provided through contact with SHIPLYS Stakeholders' Advisory Committee.

2. Scientific community

   Presents a diverse network of interacting scientists working individually or as members and employees of different scientific organizations such as universities, research centres or research institutes. Within the project, focus will be put specifically on the European scientific network. When reviewing the SHIPLYS project in particular, several consortium partners represent a direct link to the rest of the European scientific community since they are its important members.

3. SHIPLYS Stakeholders' Advisory Committee (SAC)

   SAC is an external industrial advisory group comprising a number of managers from major stakeholders interested in the objectives and results of the SHIPLYS project. They will assist with their opinions and expertise at the development of a competitive ship design tool[3] capable to undertake the challenges posed by the shipbuilding needs. To comprise a final list of SAC members, 17 companies (shipyards, ship-owners and shipping companies) have been asked to express their interest in participation, most of them giving a positive response.

Market's size and trends of development

A thorough analysis of the market where the SHIPLYS tool will be launched will specify its dynamics and will demonstrate the strengths, weaknesses, opportunities and threats of the new company (SWOT analysis).

Furthermore, the study of the market will provide all the necessary information to outline the investing environment, as well as its characteristics, the profitable market segments and the primary product targets.

Today in Europe around 80 to 90% of all goods imported and exported are transported by sea (1400 Bn Tonne-km, with a value of €1792 Bn – over 50% of all external trade), and within the EU more than 40% of goods are carried by water. On average, the cost of waterborne transport is less than 1/5 of the cost of road transport. 192 million people were transported by water in 2014, excluding cruises.5 Offshore

[3] To this direction a Quality Function Deployment (QFD) process has been planned by AS2CON, as part of the deliverable D2.2: 'A report on business case and ROI', in order to collect and prioritise the users' needs and requirements of a ship design software, as well as define the functional characteristics of the software and their relationship to the users' requirements.

vessels were the EU's strongest growing sector; EU share of the world offshore vessel market grew from 28% in 2004 up to 37% in 2014.

Furthermore, more than 3 million people work directly in the European maritime industry, which represents more than 1% of the EU's GDP, and around €200 billion of turnover with a value added of €100 billion, continuing to grow at twice the rate of global GDP over the past ten years. Within this, the EU shipbuilding sector has more than 300 shipyards and a network of over 9,000 subcontractors, mainly SMEs, accounting for a total of about 350,000 jobs and a turnover of around €34 billion[4].

According to CESA (Community of European Shipyards` Associations), the total number of European shipyards exceeds 300 shipyards producing, converting and maintaining merchant and naval ships and other hardware for maritime applications. They are responsible for approximately € 30 billion turnover each year, out of which 10% is invested in Research Development and Innovation. European design offices are on, the other hand, harder to assess in exact number but their relevance as a primary target is undoubtedly important.

3.2 Competition

Next step to the market analysis is the examination of the potential competition of the new product. Similar products already available in the software market need to be investigated and evaluated, by analysing the specific characteristics of each one and recognising possible advantages or disadvantages compared to the new developed SHIPLYS software tool. Additionally, the price policy of the competitive software, already in the market, should be investigated in order to develop a price strategy for market entry (including all the other variables influencing the price of a product).

SHIPLYS partners have identified and collected the most commonly used systems and software tools that are relevant to the developed SHIPLYS tool and acknowledged which of these software packages meet the requirements for the conceptual ship design. Most of these tools are very complex and may have additional functionalities that are irrelevant to the early ship design while one of the main goals of the SHIPLYS Consortium is to develop a simple and easy to use ship design tool that will be able to perform fast conceptual ship design tasks and that will perform life cycle and risk assessments (while most of the SW packages in the market don't perform LCC/LCA analyses).

The most relevant software tools are listed below[5]:

- MAXSURF (including PREFIT and HYDROMAX): Maxsurf is used to improve the hull surface fairness and refinement of the hull, the addition of appendages, compartmentation, etc. Prefit is the MAXSURF module for the initial 3D hull form design and Hydromax is a MAXSURF module that offers the user the capability to calculate basic hydrostatic calculations and perform intact and damage stability (including probabilistic) analysis. Its license is renewed annually and it costs around 730 €[6].
- NAPA: Flexible and efficient design tool from the contracting phase through to detailed design phase, enabling rapid design changes and optimization. Primary functions include hull surface editing, hydrostatics and stability calculations. Can be used as a standalone system and can be combined with various Classes' software like Lloyd's Register's RulesCalc etc.
- CAFÉ: User-oriented software for rapid ship design. Its functionalities are fast modelling capabilities, ship design calculations, 3D ship and equipment models importation, automatic generation of classification drawings, rapid and parametric definition of shipbuilding entities, FE

[4] The shipping market information have been replicated from the Grant Agreement of the SHIPLYS project

[5] This list is created based on the SHIPLYS SIS Collection-rev.2 document and the Ship Design Software list presented in Deliverable D3.1

[6] Prices in euro are estimated based on February's 2017 exchange rates

models, automated meshing and FE analysis. Licence costs 5.000 € and 10% discount is offered for each additional license.

- CATIA [3DS]: One of the most common CAD-tools used for 2D and 3D design and engineering. It delivers the ability not only to model a product, but to do so in the context of its real-life behaviour: design in the age of experience. Systems architects, engineers, designers and all contributors can use it.
- AQUARIUS: 2D CFD sloshing simulation for cargo tanks or other large tanks sensitive to sloshing loads. Software includes module to assess the strength of tank plates and stiffeners. It offers a downloadable installer for client machine and server installation and its price is around 2.370 €.
- AVEVA MARINE: Its functions include hydrodynamics & hydrostatics, structural design, outfitting design, production planning (manufacture and assembly) and 3D model import of equipment items. It can be used as a standalone system and can be combined with various classes' software like Lloyd's Register's RulesCalc etc.
- FORAN [SENER]: Integrated Shipbuilding CAD/CAM/CAE system that, because of its high-level features, adaptability and customization, can be used to design and build any type of ship or marine structure. FORAN makes it possible to share engineering information with PLM, ERP and MRP systems, FEM tools and other specific CAE applications. It features advance surfaces, surface model, power prediction, hydrostatic, general arrangement, spaces & capacities, launching and floating, loading conditions, damage stability, product model, drawing generation, hull structure, structure 3d model, building strategy, outfitting, electrical, advance design and drafting. Also, it provides easy exchange of data thanks to the off-the shelf database structure, the system architecture & standards and hoc interfaces.
- RHINO: 3D surface editor primarily used when working with hull forms. Capable of handling IGES and STEP files amongst many others. It uses the grasshopper facility for fairing. It is available with a downloadable installer and its price depends on scope delivered.
- SESAM [DNV-GL]: Ship and offshore structural analysis software (initial and detail design stage). It offers hydrostatic and hydrodynamic analysis, stability analysis, concept modelling and automated processes, static and dynamic structural analysis incorporating environmental load calculation (wind, waves, current). The educational license costs 2960 €/per year and the commercial licence over 110.000 €/per year.
- SHIPCONSTRUCTOR [SSI]: An AutoCAD based software product line created for design, engineering and construction in the shipbuilding industry. Its AutoCAD foundation provides a user environment that is a globally recognized CAD/CAM standard. It offers 3D product models, CAD, draught calculations and production drawings.
- SOLIDWORKS [3DS]: Solid modelling CAD and CAE computer program for ship design, providing fast modelling capabilities, ship design calculations, 3D ship and equipment models importation, automatic generation of classification drawings, rapid and parametric definition of shipbuilding entities, FE models, automated meshing and FE analysis. It is available to partners of the project for free.
- NAVCAD [HYDROCOMP]: Used for the design and analysis of virtually any type of mono-hull or catamaran – from large displacement vessels to fast planning craft. Its features are bare-hull resistance prediction, steady-state propulsion analysis, added resistance, propeller selection, hull-propulsion interaction, vessel acceleration and supplemental analyses. It can be used by naval architects and designers hydrodynamicists and researchers, ship and boat builders, propulsion equipment manufacturers, navies, coast guards and schools.
- PARAMARINE [QINETIQ]: a fully integrated naval architecture tool. It offers concept design, stability and hydrostatic assessment (both damaged and intact), manoeuvring performance,

powering and endurance, seakeeping and structural analysis. Lastly, it provides a two-way data transfer interface to FORAN.

- MAESTRO: Design, analysis and evaluation tool for floating structures. Its functionalities are finite element analysis, structural limit state evaluation, structural design tool, linear static analysis, natural frequency analysis, optimization, ship-based loading patterns and possibility to include criteria from classification society. It is organized within an open software architecture, with a set of core components, and integration with supporting software modules and interfaces
- MARS2000 [VERISTAR]: allows to check the scantling of any transverse sections or any transverse bulkheads all along the ship length according to Bureau Veritas Rules and IACS Common Structural Rules for bulk carriers and tankers. For a transverse section, it calculates the geometric properties, the hull girder strength criteria, the hull girder ultimate strength, the rule scantling of strakes, longitudinal and transverse stiffeners taking into account a) yielding criteria, b) minimum thickness criteria and c) buckling criteria.
- PIAS [SARC]: Used to create, calculate and analyse ship design from preliminary stage to final design. Its features are hull design and lines plan, hydrostatics and intact stability, resistance and propulsion, and damage stability. The price of the software depends on the modules and functionalities selected by the user.
- SIMULATIONX [ESI]: It's a multi-physics simulation software for analyses and optimizations of ship systems. Evaluation of various design layouts for new developments and retrofitting projects, assessment of potential weak points of ship systems that are already in operation, from concept studies to design and system analyses to safety compliance certification.
- DELFTSHIP [Delft University of Technology]: Used for 3D hull form modelling; able to perform basic hydrostatic and resistance calculations in an easy to use environment. It is offered in 4 editions: DELFTship free, DELFTship professional (at 150 €), DELFTship extensions (extensions need to be purchased separately) and DELFTload (loading computer software).
- ABAQUS [3DS]: The ABAQUS Unified FEA product suite offers powerful and complete solutions for both routine and sophisticated engineering problems covering a vast spectrum of industrial applications. In the automotive industry engineering work groups are able to consider full vehicle loads, dynamic vibration, multibody systems, impact/crash, nonlinear static, thermal coupling, and acoustic-structural coupling using a common model data structure and integrated solver technology. Its license costs over 70.000 €/year.

The potential competition of the SHIPLYS software will be revaluated at the end of the project taking into consideration the developments in the ship design software market and the business environment at that time.

Finally, possible business collaborations among SHIPLYS and these software tools may be practiced. Companies already active in the market, where the SHIPLYS software will be entering, may offer business opportunities and reduced marketing costs, operating and support costs etc. Regarding software apps, companies already in the market, can offer distribution, aftersales support, service, upgrades etc.

4 Business models

A business model describes the rationale of how an organization crates, delivers and captures value.

There are numerous of available business models that software companies decide to use and can potentially be applied for SHIPLYS tool commercialization. However, the specific business model to be applied in this case depends on several factors:

1. The level of product completion at the end of the project
2. The agreement between project partners depending on their areas of expertise and individual company interest

Taken all the before mentioned into account, the following section will provide an overview of the first suggestion on a business model to be used. Several other models will be taken in consideration before the completion of the final business plan and will be reviewed in more detail as the project progresses.

4.1 Form of the undertaking

Before the product is ready to be launched in the market, a number of decisions should be made by the beneficiaries of the SHIPLYS tool.

The exact location of the hardware and the origin of software offering, depends on a number of criteria that needs to be investigated (tax environment, developing market, access to international markets etc.) because they will play a significant role to other business decisions. The type of legal form provides different opportunities for business activities. Then, once the company's administrative headquarter is established, the company's partners must examine the commercial laws of the country the company is located and complete all the activities necessary to establish the company, including the selection of the name (probably the name of the SHIPLYS software), the preparation of all necessary legal documents and the registration.

At the end of the SHIPLYS project one or more members of the project will be selected to maintain the software and sell or licence it with royalties paid to consortium members. If more than one partner are selected for the commercial exploitation of the SHIPLYS tools, the percentages of each member to the new company and their obligations to its operation will be determined.

All production processes will be agreed during the development stage of the software - in SHIPLYS project. The software development may include further redesign activities or the construction of additional modules. In the case the consortium will decide that the also hardware must be included in the offered product (for optimisation of the resources) additional production, distribution and service activities should be included.

4.1.1 IP strategy

Software intellectual property (IP) is much easier to be copied or re-used compared to a physical property. In order to protect intellectual rights of new developed products (in this case software) there are legal tools that can be used. The Consortium Agreement establishes the key obligations for IP among the partners of the SHIPLYS project[7] while the IP protection of the completed SHIPLYS tool on the market is planed to be developed in more detail throughout the project.

[7] The principles concerning background IP, foreground IP and dissemination of the SHIPLYS software are objects of interest of the deliverable D9.3: 'SHIPLYS Intellectual Property Protection Strategy'.

4.2 Sales strategy

Following the initial installation of the software to selected SME partners of the SHIPLYS project and their supply chain, a European sales network will be established. Additionally, partnerships and co-operations should be pursued in order to expand the customer basis. With regard to exploitation of the new software, potential business collaborations with other software developers could be considered. Companies already active in the market (where the SHIPLYS software will be launched) may offer business opportunities and reduced costs in establishing a sales network, marketing costs, operating and support costs etc.

4.2.1 Pricing strategy

As it has been already mentioned, market analysis will provide the information for planning a pricing strategy for the new software product. The company should compare competitors' prices for similar products or services and decide on the ideal price the market can accept taking into account the expenses and the profit.

However this is not the only decision maker factor. Additional pricing activities could be decided so as to attract more customers or customers from different corporate sectors. These activities include discounts, preferential payment terms and different pricing for different customers in exchange for providing feedback on the software or advertise the product to their supply chain. Furthermore, packages offering could be used for installation, maintenance and training services.

4.3 Key resources

Personnel

The procedures for employing the required personnel should be optimised in order to best use the human resources of the company.

Infrastructure

Planning of all the necessary equipment for the proper operation of the company will be carried out. Equipment includes all necessary infrastructures of the facilities of the new company and the tools for development, promotion, sales and support the new product.

Potential cooperation with external partners

Cooperation with other software developers, sale companies or other external partners will be considered at the end of the project.

4.4 Promotional strategy

Promotional activities describe how a company promotes a product or service within a market. Different activities are often used with respect to the type of the product (e.g. physical product or services). In our case, the SHIPLYS software tool requires its own distinctive promotional strategy.

Activities for the promotion and introduction of the new product to the market include the activities performed during the period of the SHIPLYS project (according the Dissemination Plan) and all the activities that will take place once the SHIPLYS software tool will hit the market.

Dissemination within the project (focuses on the project development and results)

The dissemination plan[8] has been described on a 3-year basis by the SHIPLYS Grant Agreement. Common best practises include the construction of the SHIPLYS project website, the designing of a logo, publishing brochures and posters, 'spreading the word' inside the shipping industry, sending out the first press releases and considering further dissemination activities.

Additional activities include the protection of the foreground IP, extend the project's website, promote the project at conferences and events, submit papers to academic journals and engage with the wider press. Finally, a number of activities already used in the first period of the dissemination plan (the promotion of the project in conferences and events, focus on exploitable results, submit papers to academic journals and engage with the wider press) can be further applied along with the creation of a detailed exploitation plan for the final product of the SHIPLYS project.

Software promotion (focuses on the promotion of the final product)

Once the SHIPLYS software tool is ready to be introduced in the market a set of activities already used during the lifetime of the project, along with new promotional activities, should be planned for the successful promotion of the software.

- Product webpage

The SHIPLYS webpage already created at the stage of the software development should be updated with a presentation of the project's results, offering a detailed demonstration of the software tool and its capabilities. Furthermore, a new sales page tab should be created for any potential buyers. Additionally, it should be discussed among the webpage administrators the possibility of a free demo version of the software available for promotional reasons.

Another Internet tool that probably can be used to promote the SHIPLYS webpage is the Search Engine Optimisation (SEO). SEO helps a webpage to get found online and it also helps the webpage appear higher in a search engine's results when someone enters specific search terms.

- Advertising campaigns

There are numerous advertising tools that can be used to promote the developed software. Internet campaigns can be designed, using links or banners to related web pages, where members of the maritime community can be informed about the project and attracted to the SHIPLYS webpage.

Another beneficial tool for online promotion of the SHIPLYS software could be the use of social media. Facebook, Twitter, and LinkedIn have been proven beneficial to businesses as they develop their marketing strategy. Social media advertising offers the possibility of multiple campaigns to targeted audiences.

Finally, articles and advertising in relation to the shipping community magazines and/or journals can be used for promotional reasons. The official EU communication channels will also be used to directly transmit press releases, articles and promotional material.

- Conferences/ Symposiums

Every year several conferences, symposiums and meetings are organised for maritime community stakeholders. These events offer an excellent opportunity for promoting the SHIPLYS software by scheduling presentations/speeches, distributing promotional material, creating advertising stands etc. The company exploiting the SHIPLYS software could also organise separate meetings or exhibitions and invite members of the shipping community.

[8] The dissemination strategy is presented in the Deliverable D9.1: 'SHIPLYS dissemination strategy', developed by AS2CON.

5 Financial analysis

5.1 Short & Long-term Financial Strategy

5.1.1 Financial / Funding Scheme

The funding scheme of a new established company is the financial plan built to predict the amount of resources needed on a year basis for the proper functioning of the business and the coverage of its needs. The administrator(s) of the company will determine the necessary starting capital for the business to 'kick-off'. Equity capitals, loans or other sources of funding could cover the necessary investment capital. Often, banking loans are used, bonds are issued to attract external funds or even additional grants could be pursued. Furthermore, for the purchase of the necessary equipment and infrastructure, the leasing method could be used.

At some point in the life of the company, recapitalisation may be decided in order to attract additional capitals to cover unexpected expenses or finance new investments. Recapitalisation will alter the company's financial scheme.

Total amounts of capitals and funding, interests of loans or leases and time periods of the funding tools deployed will be used to estimate and forecast the financial results of the company.

5.1.2 Income

The company's earnings will derive from the total sales of the SHIPLYS software tool designed for maritime stakeholders of the European community. The total number of software licences sold (or leased for a period of time) and the pricing strategy selected by the administrator(s) will measure the total amount of income for the number of years the company is active.

However, additional income for the company could derive from delivering technical support to licenced users, organising SW training seminars and periodic maintenance (of the software or hardware) but also from potential SW updates and additional databases. In this case, additional pricing strategy should be planned for the provided services by the technical department of the company.

5.1.3 Development & Operating Cost

1st Period – Product development

During the 3-year development period of the SHIPLYS tool, all costs are funded by the European Union's Horizon 2020 research and innovation programme. Eligible and ineligible costs of the project follow the criteria dictated by the Grant Agreement, along with methods for cost calculations and specific conditions for each of the cost categories. Eligible costs for the development period are listed below:

Table 1: SHIPLYS Development Costs

Costs	Year 1	Year 2	Year 3
Direct Personnel Costs			
Personnel Direct Contracts			
Costs Of SMEs Beneficiaries			
Costs Of Physical Persons Beneficiaries			
Subcontracting			

Financial Support To Third Parties			
Travel Costs			
Equipment / Infrastructure			
Renting / Leasing			
Goods And Services			
Capitalised And Operating Costs			
Marketing / Dissemination Activities			

2nd Period – Product in the market

Operating costs include all the expenses related to the operation of a business in order to fulfil its goals. Main categories of these costs are presented in the next table:

Table 2: Operating Costs

Costs	Year 1	Year 2	Year 3	Year …..
Funding				
Property / Capital Costs				
Financial /Loans				
Depreciation				
Operational Costs				
Payroll Expenses				
Travel				
Marketing				
Dissemination				
Sub-Contracting				
Insurance				
Legal / Accounting Services				
Liabilities				
Equipment Maintenance				
Supplies				
Communication				

Taxes				
Infrastructure				
Goods & Services				
Renting / Leasing				
Other				

5.2 Financial Forecast

Using all the available information for the external market, the economic indicators and the predictions for future incomes and business costs, an estimation of the future financial outcomes of a new business investment can be attempted. The financial forecast, presenting economist's best guess of what will happen to a company, in financial terms, over a given time period, faces a number of challenges, mainly due to the difficulty of predicting the future revenue of a company.

Considering the 5-year intermediate term proposed in the SHIPLYS Grant Agreement, the business partners will be able to obtain updated information on the market characteristics and the behaviour of the SHIPLYS product. Then, the financial forecast will be able to provide improved results for longer periods of time. Meantime, new co-operations may take place and potential changes in the SW tool modules based on an updated legal framework will probably transferred in the product.

Profit and loss forecast, cash flow forecast and balance sheet forecast can provide some useful conclusions on the predicted economic life of a company. The following tables depict a general preview of these forecasting tools that will be used in the SHIPLYS business plan.

5.2.1 Profit & Loss Forecast

A profit and loss forecast attempts to predict the financial outcome from selling products or services. It is a forecasting tool used to ensure that profits exceed the costs of the company and can play an essential role in the formation of a plan for returning to profitability.

Table 3: Profit & Loss Forecast

REVENUE	Year 1	Year 2	Year 3	Year ….
Sales				
Cost of Goods Sold				
Gross Profit				
Gross Margin Percentage				
Other Income				
PAYROLL EXPENSES	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Payroll				
Payroll Taxes and Benefits				
OPERATING EXPENSES	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Depreciation				
Interest Expense				
Marketing				
Utilities				
Total Operating Expense				
TOTALS	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Earnings Before Taxes				
Tax Percentage				
Income Taxes				
Net Profit after Tax				
Owner's Draws and Dividends				
Change in Retained Earnings				

5.2.2 Cash Flow Forecast

The cash flow forecast allows a company to estimate its future requirements in cash and plan its business activities in accordance with its liquidity. It can also display the period of time (months/year) when cash availability is in its highest level.

Table 4: Cash Flow Forecast

CASH IN	Year 1	Year 2	Year 3	Year ….
Other Income				
Loans Requiring Payback				
Investments				
Total Cash In				
CASH OUT	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Cost of Goods				
Other Expenses				
Payroll				
Cash Paid for Taxes				
Cash Paid for Fixed Assets				
Loan Principal Payments				
Loan Interest Payments				
Owner's Draws and Dividends				
Other Assets				
Total Cash Out				
TOTALS	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Starting Cash Balance				
Net Cash Flow				
Ending Cash Balance				

5.2.3 Balance Sheet Forecast

A balance sheet forecast provides a depiction of the financial state of a company at a specific point in the future giving an estimation of its assets and liabilities at this certain moment (future date/end of the year).

Table 5: Balance Sheet Forecast

ASSETS				
CURRENT ASSENTS	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Cash				
Accounts Receivable				
Inventory				
Total Current Assets				
FIXED ASSENTS	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Fixed Assets				
Less Accumulated Depreciation				
Net Fixed Assets				
Other Assets				
CURRENT LIABILITIES	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Accounts Payable				
Deferred Revenue				
Short Term Debt				
Total Current Liabilities				
LONG-TERM LIABILITIES	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Long Term Loans				
Total Capital				
TOTALS	**Year 1**	**Year 2**	**Year 3**	**Year ….**
Total Assets				
Total Liabilities and Capital				

5.3 Performance indicators

The most common tools used for this purpose are NPV and IRR indicators.

5.3.1 NPV & IRR

Net present value (NPV) is a popular measure used to determine the present value of an investment by the discounted sum of all future cash flows. A profitable investment gives positive NPV at the end of the examined period (the higher the NPV value the most profitable the investment). The formula for estimating NPV is:

$$NPV = \sum_{i=1}^{n} \frac{C_i}{(1+r)^i} - C_{in}$$

Where C_i is the amount of the investment, r is the discount rate, n the total time of the investment and C_{in} the initial amount of the investment.

Using the formula for the NPV one can estimate IRR by assuming NPV's value equal to 0. The Internal Rate of Return (IRR) is used to measure and compare the profitability of an investment and shows the rate of return of the initial capital invested.

5.3.2 Sensitivity & Risk Analysis

Sensitivity and risk analysis provide a framework for evaluating new investments reducing the possibility of undertaking a bad investment. By changing the value of specific parameter, in a given range, the respective values of NPV and IRR change accordingly giving better or poorer results. This in turn provides a 'safe' operating range for the company. Additionally, the risk analysis gives the probability to have the performance indicators (NPV and IRR) to specific price range.

5.4 Financial ratios

5.4.1 Cash Flow Ratio, Operating Ratio, Financial Leverage Ratio, Gross Margin Ratio, Efficiency Ratio

Financial ratios are indicators of the performance and financial condition of a company based on data provided in the annual balance sheets. They can be used in order to compare economic results of a business within its market and predict economic trends of its operation. They are usually classified in Cash Flow Ratios, Operating Ratios, Financial Leverage Ratios, Gross Margin Ratios and Efficiency Ratios.

5.5 Results of the Financial Analysis

The developed business plan refers to the business exploitation of the SHIPLYS software tools along with the estimations of the future income and costs. This can be used in forecasting the economic results of the company to be formed.

More specifically, based on the financial scheme of the company and the activities accomplished for the business launch, there are several performance indicators that allow to assess the economic performance, follow the progress against specified strategies and assist the business administrator(s) to execute adjustments to the business strategy when necessary. The performance indicators used in the analyses are Net Present Value (NPV) and Internal Rate of Return (IRR). [*At the final business plan, follow the results of the implementation of the NPV and IRR*]

Another important indicator used for the business investment evaluation is the Break-Even point. Break Even analysis is the estimation of the level of sales needed to cover the fixed costs. At this point there is no loss or profit for the investigated business. Break-Even point changes by changing the price strategy of the company. [*At the final business plan, follow the comments on the estimated Break-Even point*]

Furthermore, specific financial indicators related to cash flow ratios, operating ratios, financial leverage ratios, gross margin ratios and efficiency ratios can be used for mapping the performance assessment of the company. [*At the final business plan, follow the results of the implementation of the various indicators*]

Additionally, a sensitivity analysis determines the impact of uncertainties and different values used in the various estimations for the economic performance of the company. Moreover, a risk analysis identifies and manages potential problems that could undermine business initiatives or projects. [*At the final business plan, follow the results of the implementation of the sensitivity and risk analyses*]

6 Concluding Remarks

The current deliverable outlines the necessary activities for the initial exploitation and a business plan for a successful market entry of the SHIPLYS software tools. The development of a business plan is an ongoing task in the SHIPLYS and will be updated throughout the project's life, taking into account the progress of the project and the market developments. Financial performance indicators will be estimated using inputs from all the tasks and the individual partners of the SHIPLYS consortium as the project goes on.

Future exploitation and marketing activities for the software tools will be included in the final business plan (deliverable D9.5) that will be issued towards the end of the project. [*Key findings, comments on assumptions and impact of the product from the final business plan will be listed at this point*].