PROJECT DELIVERABLE REPORT

Introducing advanced ICT
and Mass Evacuation Vessel design
to ship evacuation and rescue systems

D9.4 Exploitation, Sustainability & Business Plans & Exploitation activities (1)

A holistic passenger ship evacuation and rescue ecosystem

MG-2-2-2018

Marine Accident Response

"This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 814962"

Grant Agreement Number	814962	Acronym	PALAEMON
Full Title	A holistic passenger ship evacuation and rescue ecosystem		
Topic	MG-2-2-2018: Marine Accident Response		
Funding scheme	RIA - Research and Innovation action		
Start Date	1st JUNE 2019	**Duration**	36 months
Project URL	www.palaemonproject.eu		
EU Project Officer	Georgios CHARALAMPOUS		
Project Coordinator	AIRBUS DEFENCE AND SPACE SAS		
Deliverable	D9.4 Exploitation, Sustainability & Business Plans & Exploitation activities (1)		
Work Package	WP9 – Raising Awareness, Standardisation and Exploitation Roadmap		
Date of Delivery	**Contractual** M12	**Actual**	M18
Nature	R - Report	**Dissemination Level**	PU-PUBLIC
Lead Beneficiary	ATOS		
Responsible Author	Carmen Perea (ATOS)	Email	carmen.perea@atos.net
		Phone	
Reviewer(s):	Philippe Chrobocinski (ADS), Vassiliki Apostolopoulou (ADMES)		
Keywords	ICT, Exploitation, Business Development, Business models.		

Document Information

Revision History

Version	Date	Responsible	Description/Remarks/Reason for changes
0.1	2020/07/01	ATOS	ToC first draft and initial list of contributors
0.2	2020/07/14	ATOS	ToC final version
0.3	2020/11/10	ALL	Individual Exploitation Plans
0.4	2020/11/11	ATOS	Section 2,3,4,6,7,8,9,10
0.8	2020/11/16	ATOS	Deliverable for internal review
0.9	2020/11/26	ADS, ADMES	Review
1.0	2020/11/30	ATOS	Final review

Contents

1 Executive Summary 1
2 Introduction 3
2.1 WP9 relationship with other WPs. 3
2.2 Partner distribution & effort 4
3 List of Assets and Results 5
4 PALAEMON Unique Selling Point 9
5 Individual Exploitation Plans 10
5.1 AIRBUS DEFENCE AND SPACE SAS (ADS) 10
5.1.1 Organization profile 10
5.1.2 Business Development Possibilities 10
5.1.3 Concrete exploitation path 11
5.2 ATOS (Atos Spain) 12
5.2.1 Organization profile 12
5.2.2 Business Development Possibilities 12
5.3 KONNEKTABLE TECHNOLOGIES LIMITED. (KT) 14
5.3.1 Organization profile 14
5.3.2 Business Development Possibilities 14
5.3.3 Concrete exploitation path 15
5.4 Engitec Systems International Ltd. (ESILimited) 17
5.4.1 Organization profile 17
5.4.2 Business Development Possibilities 17
5.5 IOTAM INTERNET OF THINGS APPLICATIONS AND MULTI LAYER DEVELOPMENT LTD (ITML CY) 19
5.5.1 Organization profile 19
5.5.2 Business Development Possibilities 19
5.5.3 Concrete exploitation path (to be updated in several iteration along the project) 20
5.6 Johanniter Osterreich Ausbildung Und Forschung Gemeinnutzige GMBH (JOAFG) 21
5.6.1 Organization profile 21
5.6.2 Business Development Possibilities 21
5.7 National Technical University of Athens. (NTUA) 23
5.7.1 Organization profile 23

5.7.2 Business Development Possibilities 23
5.7.3 Concrete exploitation path 24
5.8 ADVANTIC SISTEMAS Y SERVICIOS SL (ADV) 26
5.8.1 Organization profile 26
5.8.2 Business Model Canvas for Smart Bracelets 27
5.9 Software Imagination & Vision S.R.L. (SIMAVI) 28
5.9.1 Organization profile 28
5.9.2 Business Development Possibilities 28
5.10 DEUTSCHE SCHLAUCHBOOT (DSB) 30
5.10.1 Organization profile 30
5.10.2 Business Development Possibilities 30
5.11 JADE HOCHSCHULE WILHELMSHAVEN/OLDENBURG/ELSFLETH (JHS) 31
5.11.1 Organization profile 31
5.11.2 Business Development Possibilities 31
5.12 ERICSSON HELLAS SA TILEPIKOINONIAKOY ILINOX (Ericsson Hellas) 33
5.12.1 Organization profile 33
5.12.2 Business Development Possibilities 33
5.13 Romanian Naval Authority (RNA) 34
5.13.1 Organization profile 34
5.13.2 Business Development Possibilities 34
5.13.3 Concrete exploitation path 34
5.14 DANAOS SHIPPING COMPANY LIMITED (DANAOS) 35
5.14.1 Organization profile 35
5.14.2 Business Development Possibilities 35
5.14.3 Concrete exploitation path (to be updated in several iteration along the project) 36
5.15 ENGINEERS FOR BUSINESS IPIRESIES TECHNOLOGIAS KAI MICHANIKIS ANONIMI ETAIRIA (EfB) 37
5.15.1 Organization profile 37
5.15.2 Business Development Possibilities 37
5.15.3 Concrete exploitation path 39
5.16 ASTILLEROS DE SANTANDER SA (ASTANDER) 40
5.16.1 Organization profile 40
5.16.2 Business Development Possibilities 40
5.16.3 Concrete exploitation path 41

5.17 DNV GL HELLAS SA (DNV GL) 42
5.17.1 Organization profile 42
5.17.2 Business Development Possibilities 42
5.18 ADMES MONOPROSOPI IDIOTIKI KEFELAIOUCHIKI ETAIREIA (AdMeS) 45
5.18.1 Organization profile 45
5.18.2 Business Development Possibilities 45
5.18.3 Concrete exploitation path 47
5.19 THALES ITALIA SPA (THALIT) 48
5.19.1 Organization profile 48
5.19.2 Business Development Possibilities 48
5.19.3 Concrete exploitation path 49
5.20 Universidad De Alcalá (UAH) 50
5.20.1 Organization profile 50
5.20.2 Business Development Possibilities 50
5.20.3 Concrete exploitation path 52
5.21 University of the Aegean (UAEGEAN) 53
5.21.1 Organization profile 53
5.21.2 Concrete exploitation path 54
5.22 WISER SRL (WISER) 55
5.22.1 Organization profile 55
5.22.2 Business Development Possibilities 55
5.22.3 Concrete exploitation path 55
5.23 Palaemon End users. ANONIMI NAFTILIAKI ETERIA KRITIS (ANEK) S.A. and OESTERREICHISCHER LLOYD SEEREEDEREI (CYPRUS) LTD (OELS) 56
6 PALAEMON Value Proposition and Business Model Canvas 57
6.1 Shipping Companies Profile 57
6.2 Business Model Canvas 57
6.3 Value Map 58
6.3.1 Smart Evacuation Management System Value Map 59
6.3.2 MEV Value Map 59
6.3.3 Training Academy Value Map 60
7 Joint Exploitation Plan 61
7.1 PALAEMON Provider Ecosystem 61
7.2 Exploitation opportunities 62
7.3 Monetization 63

7.3.1 Monetization of the Platform 63
7.3.2 Monetization of the MEV 63
8 Intellectual Property Rights 64
9 Conclusions 65
10 REFERENCES 67

Table of Tables

Table 1. Partner distribution & effort 4
Table 2 List of PALAEMON Exploitation Assets 5
Table 3 KT Timetable for exploitation 15
Table 4 KT Key performance indicators (Bridge crew) 15
Table 5 KT Measurement of achievement (Captain Bridge) 16

Table of Figures

Figure 1.WP2 Dependencies with other WPs 3
Figure 2 Smart Bracelets Business Model Canvas 27
Figure 3 Smart Camera system Business Model Canvas 51
Figure 4 Shipping Companies Profile. Building Block Customer Profile using Value proposition Canvas by Strategyzer 57
Figure 5 PALAEMON Business Canvas (Source: Strategyzer) 58
Figure 6 Smart Evacuation Management System (All technologies included) MEV (Source: Strategyzer) 59
Figure 7 Value Proposition MEV (Source: Strategyzer) 59
Figure 8 Value Proposition Training Academy (Source: Strategyzer) 60
Figure 9 PALAEMON Provider Ecosystem 61
Figure 10 Different exploitation models 63
Figure 11 Licenses compatibility David A. Wheeler (2007) 64
Figure 12 PALAEMON Gitlab 64

Abbreviations

CMS	Condition Monitoring System
CPRI	Common Public Radio Interface
COTS	Commercial Off-The-Shelf
DSS	Decision Support System
eCPRI	Evolved Common Public Radio Interface
EMSA	European Maritime Safety Agency
EPC	Evolved Packet Core
GA	General Alarm
GCS	Ground Control Station
MEV	Massive Evacuation Vessel
MOB	Man Overboard
NDT	Non-destructive tests
RCC	Rescue Coordination Centres
SRAP	Smart Risk Assessment Platform
TRL	Technology Readiness Levels
UAS	Unmanned Airborne System
UAV	Unmanned Aerial Vehicle
USAR	Urban Search and Rescue
VHF	Very High Frequency
VTOL	Vertical take-off and landing
VTS	Vessel Traffic Services
Weather Forecast Tool	WFT

1 Executive Summary

Task description from DoA:

T9.2 Exploitation Strategy & PALAEMON Business Plan (M12-M36) ATOS will be in charge for the coordination of the exploitation and commercialization strategy. This will comprise different phases such as product identification, market analysis, preparation of product launch and strategic alliances.

In the process there will be the definition of values proposition, the market and competition analysis and the characterization of the configuration of the value creation (partners, value change, customer relationship, etc.). Based on them, economic analysis will be performed to evaluate the profitability of the revenue model, understand future cash flow and highlight the need for additional funding or external investment to reach the first stage. The whole analysis will be summarized in the business plan report. The details and overall planning specifications will be described in the PDER (Plan for the Dissemination and Exploitation of Results). The Exploitation Manager will develop a programme to investigate the potential impact of the project results on the relevant standards and will develop measures to comply with or advocate their modification to relevant organizations.

The document provides the first PALAEMON Exploitation deliverable “D9.4 – Exploitation, Sustainability & Business Plans & Exploitation activities (1) ” (Grant Agreement No.: 814962), funded by the European Commission’s Directorate-General for Mobility and Transport (DG MOVE), under its Horizon 2020 Research and Innovation Programme (H2020). The deliverable is the outcome of one task developed in Work Package 9 Raising Awareness, Standardisation and Exploitation Roadmap scheduled from M12-M36.

Disclaimer: Due to the fact that T9.2 started in M12, D9.4 has been moved to M18, because it was an error to place the deliverable D9.4 in M12 just at the beginning of the task.

- T9.2 Exploitation Strategy & PALAEMON Business Plan (M12-M36)

This report seeks to describe the fulfilment of the PALAEMON Exploitation objectives during this period:

- Identify PALAEMON exploitable results
- State the PALAEMON Unique Selling Point.
- Collect partners individual exploitation plans
- Define the PALAEMON business models alternatives
- Identify the Value Proposed for the customers
- Study the range of monetization alternatives
- Stablish a procedure to protect the Intellectual Property Rights

The information provided in this report is complemented with the information in D9.3 Market Analysis which provides information about the state of the market, environment, competitors and Stakeholders.

PALAEMON provides a wide range of solutions to be offered to customers, since some results can be offered as stand-alone products and other results can be offered combined with others.

Furthermore, the consortium has set the basis to select, define and build a joint exploitation alternative, based on the findings of the aforementioned approaches.

2 Introduction

The current document is structures as follows:

Chapter 1: Executive Summary.

Chapter 2: Introduction.

Chapter 3: List of Assets and Results.

Chapter 4: PALAEMON Unique Selling point.

Chapter 5: Individual exploitation plans.

Chapter 6: PALAEMON Business Model and Value Proposition.

Chapter 7: Joint Exploitation Plan.

Chapter 8: Intellectual Property Rights.

Chapter 9: Conclusions.

Chapter 10: References.

2.1 WP9 relationship with other WPs.

WP9 “Raising Awareness, Standardisation and Exploitation Roadmap” is a horizontal WP that provides support to the rest of PALAEMON Work packages.

Together with WP2, WP9 is the core of the PALAEMON Project, this Work Package provides the means for successful dissemination, communication and exploitation of the project. Figure 1 shows how WP9 is related with the technical WPs (WP3-WP4-WP5-WP6), which in turn are the foundations of WP7, in which the technology is integrated, and WP8, where the results are validated under the different pilots and trials. Also, WP2 (Use Case Driven Requirements Engineering and Architecture) is specifically related to WP9, since they are the central pillars of the rest of WPs.

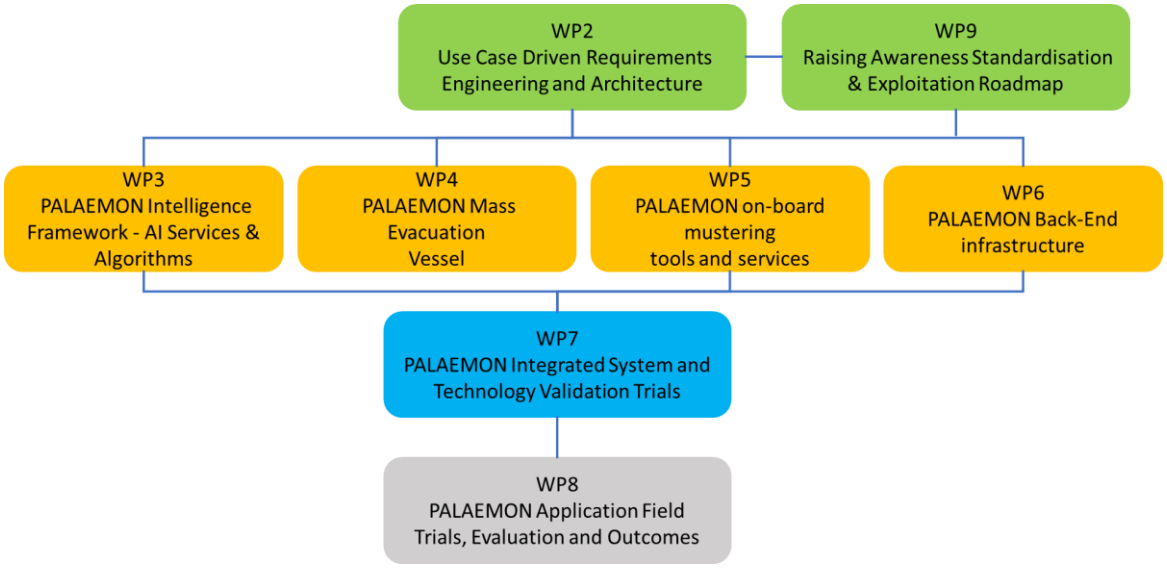

Figure 1.WP2 Dependencies with other WPs

WP9 started with the deliverable D9.1 PALAEMON Dissemination Plan and activities Report on M12 (May 2020) and it is followed by the current deliverable, D9.4 Exploitation, Sustainability & Business Plans & Exploitation activities (1) and D9.3 Market Analysis which form the first block of dissemination and exploitation deliverables in which the principles and foundations to achieve the success of the Dissemination and Exploitation tasks are established.

2.2 Partner distribution & effort

Table 1. Partner distribution & effort

Partner	**Role**	**T9.2**
ADS	Aerospace	1
ATOS	**ICT**	10
KT	ICT	2
ESI	Maritime	2
JOAFG	Emergency Response	3
NTUA	Maritime	1
ADSYS	ICT	1
SIMAVI	ICT	2
RNA	Maritime	1
EFB	Engineering	1
AST	Maritime	1
DNVGL	Maritime	1
ADMES	Engineering	1
THALIT	Aerospace	1
WIS	ICT	1
ANEK	Maritime	1
OELSR	Maritime	1
DANAOS	Maritime	3

3 List of Assets and Results

Table 2 contains the initial list of PALAEMON exploitable assets. The list might evolve throughout the project and new results could be added. The following information is shown in the table:

The list could evolve throughout the project and new results could be added. The following information is shown in Table 2:

- Name of the asset
- Owner/s
- Brief description of the asset and main functionalities
- Type of result

Table 2 List of PALAEMON Exploitation Assets

Name of the asset	Owner(s)	Brief description of the asset	Type of result
Mass evacuation vessels (MEVs) Type I & II	NTUA	Design	MEV
	ESI	New designs for larger capacity LBs, ease of access and use for all people	
	AST	New material to construction	
	DSB	Inflatable for MEV	
	EFB	Interior design of MEV. Seating that optimizes limited spatial resources while extending functionality towards groups of people with special needs. Furthermore, introducing elements that enhance passenger experience and contribute to establishing a safe and positive environment.	
UAV Inspection Module	ADS	A first version of on-board UAS (Unmanned Airborne System) for safety support integrated as part of the PALAEMON ecosystem	UAV
Safety Procedures (SMS) Tool	DANAOS	A tool to work as virtual assistance for crew and captain to comply with standardized action order in case of incident.	Software
Decision Support System for Master & Bridge command team	KT	A tool to assist the captain in the case of an event with actions to be taken in time of an incident or reach a conclusion on whether or not it is necessary to evacuate the ship.	Software
Interoperable Communication platform	ATOS, THALIT, ITML	PALAEMON-as-a-service integrated system. Joint ICT communications framework where all underlying technologies converge. In terms of design, the platform respects timely design patters (i.e., microservice-oriented architecture, service orchestration, etc.).	Software and hardware
PaMEAS	UAegean and Ericsson Hellas	Passenger Indoor Positioning System and Smart Evacuation Management Software that allows to guide (through alerts, notifications and IoT signalling) and streamline the ship evacuation process.	Software

Advanced Augmented Reality (AR) technologies	SIMAVI	Wearable devices that allow the users to experience assistive-computer generated content faster without interfering with the user movement. The asset provides real-time key information from several subsystems.	Wearable hardware and software
Condition monitoring system (CMS) Structural Monitoring Sensors	ESI, ADMES	Structure and Stability monitoring, Hw and Sw, Tool for assessment of local damage, cracks	Hardware and Software
Ship Stability Toolkit	JU, NTUA	A tool for determining the current and future floating position of the ship based on weather and hull data.	Software
PALAEMON LCA	DANAOS	Multi-criteria / Multi decision making, life cycle performance assessment of PALAEMON ecosystem	Software
Data Fusion Bus	ITML	ITML's Data Fusion Bus enables organizations in developing, deploying, operating and managing a big data environment with emphasis on real-time applications. It combines the features and capabilities of several big data applications and utilities within a single platform.	Software
Weather Forecasting Toolkit	KT, DANAOS	The Weather Forecast Toolkit will correlate the weather conditions with the evacuation actions/plans. Evacuation actions that were successful in previous incidents with similar weather conditions will be displayed at the PIMM dashboard and will give a first insight for the actions that took place in the past for a successful evacuation.	Software
VDES Transceiver	WISER/ Thales	VDES SDR transceiver implemented over a COTS embedded platform	Hardware and software
PALAEMON Academy	SIMAVI	An ecosystem that enables knowledge networking, collaboration and extraction on maritime passengers' safety. At the same time acts as an extensive network of authorized experts that may cooperate closely both domestically and at a European level, develop their capacities, generate new knowledge and contribute their expertise towards efficient passenger ship mustering and evacuation.	Software
PALAEMON Operational Centre & Academy Training program	JOAFG	Curricula for introduction of trainers and trainees to intelligence-led ship evacuation operations; preparation for practical application on sea and lake related first aid and response, new strategies for mass evacuation and crowd control in extreme situations and handling and transport of people with special needs	Training

Train the trainer handbook	JOAFG	guidance for sustainable use of curricula, including scenarios, technical background and specialised trainer tools	Training
Moodle discussion forum	JOAFG	Discussion platform and exchange of lessons learnt and related issues	Software
5G technology in emergency evacuation systems	Ericsson	• Develop innovative technologies for sensing, people monitoring and counting and localization services as well as real-time data during accident time • To be integrated into an independent, smart situation-awareness and guidance system for sustaining an active evacuation route for large crowds.	Hardware
PALAEMON evacuation coordinator	ATOS	Ship evacuation status monitor. Translation and spread of all Master and Bridge decisions and commands. In other words, communications hub among all the PALAEMON components, which may change their behavior/operation upon an evacuation status change notification.	Software
Smart Safety System	JU	Overview of evacuation situation without the need of extern communication between Bridge team and Evacuation Team (Captain, Officers, Crew)	Software
SRAP Smart Risk Assessment Platform	NTUA	SRAP is a real-time risk-based monitoring software component that will provide a colour coded risk level indication on the PALAEMON dashboard. Its purpose/goal is to assist the Master and the Bridge Command Team during three main stages of the evacuation process: 1) the initial assessment of the situation, in order to take the decision of sounding the General Alarm or not, 2) monitoring of the mustering process in order to take any additional actions (if necessary); 3) the final assessment of the situation, i.e. taking the decision to abandon the ship or not.	Software
Smart bracelets	ADSYS	Shall enable localization and tracking of every person on-board the ship (passenger and crew). 5G-based device that will transmit real-time signals, subsequently used for the localization of each passenger during evacuation process. It will also monitor and provide basic information regarding the health condition (heart rate, temperature, etc.) of every person on-board.	Wearable
Smart cameras	UAH	Smart cameras shall enable the detection and tracking of people in different scenarios: corridors, rooms, large areas. Additionally, each camera node will monitor the people behaviour in order to detect anomalous situation, such as stampedes, multiple	Software

		people running.	

4 PALAEMON Unique Selling Point

In order to define the PALAEMON Unique Selling point several features should be highlighted:

- Utilization of open protocols and technologies
- Integration (i.e., digitalization) of legacy vessel monitoring systems and safety procedure tools
- Introduction of novel and disruptive technologies (VDES, UAVs, acoustic sensors to detect crashes throughout the hull, etc.)
- Augmented Reality (AR) support to crew rescue team
- Machine Learning services to support Master and Bridge Command Team Decisions
- Digitalization of ship evacuation phases
- Cutting-edge Massive Evacuation Vessel (MEV)
- VR-based crew training via PALAEMON Academy Programme
- Interoperable platform by means of the utilization of standardized data models (e.g., NGSI-LD)
- Secure-by-design and 100% GDPR compliant data management

Taking this fact into account, the consortium stated that PALAEMON Unique Selling Point is its ability to **seamlessly connect and integrate** heterogeneous sources of information (e.g., smart cameras, fire detectors, stability sensors, smart bracelets, etc.) into a standalone open platform. As a whole, the holistic PALAEMON system will complement Master and Bridge Command Team's decision, thus leading to remarkable improvements on the evacuation management.

A competitor analysis is provided in D9.3 Market Analysis, several products offer some of the Palaemon features in an isolated way, however a solution providing a whole overview of the evacuation situation with the support of a plethora of independent sensors is not known.

5 Individual Exploitation Plans

This section contains the organization profile of each partner in the PALAEMON Consortium ,as well as: a description of the business development possibilities envisaged by each organization, a short description of the exploitable results, the exploitation interests evinced, the potential market and customers to be addressed and the potential detected risks that are provided.

5.1 AIRBUS DEFENCE AND SPACE SAS (ADS)

5.1.1 Organization profile

ADS core business is to address the defence and security topics in Airbus Group. As such, it has several lines of business that develop the components of large integrated systems. In particular for PALAEMON, two lines of business are specifically interested:

- Maritime Security Solutions for the information systems aboard vessels and the connections with external organisations (National maritime safety centres, including Rescue Coordination Centres, European Maritime Safety Agency (EMSA), Vessel Traffic Services (VTSs), etc.);
- Military Aircraft that develops UAVs in different sizes and for different missions.

In addition, ADS are the coordinator of the project, so they are interested in enriching their portfolio of large integrated systems.

5.1.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

The safety system integrated to vessels can be used to enhance the Search and Rescue missions. ADS have developed a Maritime Surveillance, Styris © [1] which is also the base of the French Navy surveillance system SPATIONAV that also equips the Rescue Coordination Centres (RCC). The capability to share information with the vessels can bring an added-value to our customers.

Regarding the UAV, it has been years that the Navies and Maritime Companies would like to have UAVs on board for surveillance and SAR purposes. The conflict between VTOLs and fixed wings (range vs operability from a ship) still exist and few decisions have been made. So PALAEMON should bring important decision support for the development of on-board UAVs.

Short description of key outcomes to be exploited and the innovation potential

The key outcomes are: 1. A first version of on-board UAV for safety support and 2. A better knowledge of Maritime companies' expectations for the future in order to propose new versions of ship-shore exchanging capabilities.

Potential addressable market & customers

Navies and Maritime companies as ADS provide 85% of long-range communication solutions for vessels.

(1)

Timetable for exploitation

The exploitation will take place in the mid-term (ca 5 years) to meet the requirements of the new generation of cruise ships.

Potential risks, barriers or limitations

Since the cruise activity is raising a lot, the market should be there for numerous years.

5.1.3 Concrete exploitation path

Since the project has not yet tested the solutions, the exploitation path is still theoretical. It will be refined in the next versions of the document.

5.2 ATOS (Atos Spain)

5.2.1 Organization profile

Atos is a global leader in digital transformation with over 110,000 employees in 73 countries and annual revenue of over € 11 billion. European number one in Cloud, Cybersecurity and High-Performance Computing, the Group provides end-to-end Orchestrated Hybrid Cloud, Big Data, Business Applications and Digital Workplace solutions. The group is the Worldwide Information Technology Partner for the Olympic & Paralympic Games and operates under the brands Atos, Atos Syntel, and Unify. Atos is a SE (Societas Europaea), listed on the CAC40 Paris stock index.

The purpose of Atos is to help design the future of the information technology space. Its expertise and services support the development of knowledge, education as well as multicultural and pluralistic approaches to research that contribute to scientific and technological excellence. Across the world, the group enables its customers, employees, collaborators, and members of societies at large to live, work and develop sustainably and confidently in the information technology space.

Atos Research & Innovation (ARI) is the R&D hub for emerging technologies and a key reference for the whole Atos group. With almost 30 years of experience in running Research, Development and Innovation projects, ARI has become a well-known player in the EU context. ATOS' multidisciplinary and multicultural team has the skills to cover all the activities needed to run projects successfully, from scientific leadership to partnership coordination, from development of emerging technologies to the exploitation of project outcomes, with a strong focus on dissemination, innovation adoption and commercialization.

Atos is a founding member of the European Technology Platform NESSI (Networked European Software and Services Initiative). ATOS is a major partner in Future Internet-related initiatives being member of the FI PPP Steering Board and Industrial Advisory Board. Since 2014, Atos is a founding member and member of the Board of Directors of the Big Data Value Association (BDVA), assuming the roles of Vice-presidency and Deputy Secretary-general. ATOS is also member of the 5G PPP Steering Board. Additionally, Atos is a member of NetWorld2020, NEM, EFFRA, ERTICO, CELTIC, NIS, EOS, ESCO, LSEC, ETSI, OW2, OASIS, AIOTI, Cloud Security Alliance, Eurocities, etc. Finally, Atos is a core member of the KICs EIT HEALTH, EIT DIGITAL, and EIT MANUFACTURING. At national level, Atos is currently holding the Presidency and Secretary of PLANETIC for ICT, as well as the Vice-presidency of es.Internet for Future Internet technologies, and is member of several others, such as PESI, Logistop, eVIA for Health and Independent Living, NanoMed or the Spanish Railways Technology Platforms (PTFE).

5.2.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

ARI is firmly encouraged to support the strategy of the company in the Transport sector. PALAEMON ecosystem supposes a big opportunity to expand the Marine global portfolio with a Smart Ship solution, complementing the Smart Connected vessels ATOS' proprietary solution.

The focus of ATOS exploitation in the project will be based on the two main components developed by ATOS(e.g.: The interoperable Communication Platform and PALAEMON Evacuation Coordinator) and provide additional services (customization, consultancy

services, training, maintenance and other personalized services) around PALAEMON platform for potential clients.

Additionally, ATOS is also focused on the integration, deployment and testing of two key component in PALAEMON: Interoperable Communication platform and the PALAEMON Evacuation Coordinator.

Short description of key outcomes to be exploited and the innovation potential

Interoperable Communication platform: PALAEMON-as-a-service integrated system. Joint ICT communications framework where all underlying technologies converge. In terms of design, the platform respects timely design patters (i.e., microservice-oriented architecture, service orchestration, etc.).

PALAEMON Evacuation Coordinator: Ship evacuation status monitor. Translation and spread of all Master and Bridge decisions and commands. In other words, communications hub among all the PALAEMON components, which may change their behaviour/operation upon an evacuation status change notification.

Potential addressable market & customers

Shipping companies are the main customer, nevertheless ATOS is considering to extrapolate the solution to other sectors in which a massive evacuation can be useful as stadiums, hotels and resorts and nursing homes.

Timetable for exploitation

The Innovation Hub in ARI foster and facilitate the innovation at the Research and Innovation department (ARI). In order to achieve such mission, about twenty business consultants and communication experts work in collaboration with researchers, technicians and managers in innovation projects to support them in finding the best way to communicate and bring their technological results closer to the market; to envisage the impact that future research may have on the market; and to facilitate the transfer of generated innovative results to ATOS business units.

Results are classified depending on their TRL and pre-commercial and commercial actions are implemented based on this. A result is going from different stages based on their maturity.

Transforming results into solutions

*Once a solution is mature t*o ensure a proper transfer, ATOS transfers the solution to incubation units for the most promising solutions aligned with the company's strategy. The idea is to transform ARI results into solutions reusable in commercial projects. Each incubator is in charge of maturing and evolving the seed solution, by fostering the development of pilots with customers or internal proof of concepts, to show the business feasibility of the solution. Besides, each incubator (called shuttle) supports the elaboration of commercial bids and tenders which include the use of such solutions; provides training to the business units; and offers technical support to delivery projects born from the transferred solution.

5.3 KONNEKTABLE TECHNOLOGIES LIMITED. (KT)

5.3.1 Organization profile

Konnektable is a technology research and development firm based in the Republic of Ireland, with offices are also located in Greece and the USA. KT combines Internet Technologies with the application of Research and Development, aiming to build software products that are powered by data-driven insights, utilizing machine learning algorithms, advanced data mining techniques semantics, data aggregation, data analytics and IoT technologies to connect disparate systems, enabling users to manage a specific process or system efficiently.

KT applies these technologies in a series of operational domains such as energy, healthcare, transport, creative industries, maritime, water, manufacturing, cybersecurity and emergency management.

5.3.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

Currently, KT is considering the following exploitation activities:

1. Introduce Weather Forecast Tool (WFT) in the existing corporate marketing and sales activities.
2. The possibility of further exploitation of WFT in new collaborative research projects and initiatives.
3. The further commercialization of the WFT to interested customers.

The Decision Support System (DSS) will be advertised through the website and other project media initiatives in order to increase the awareness of the results and the possibility for the different stakeholders to use one of the outputs of the project. Moreover, the DSS's interface will be developed in order to allow the user to test different tool configurations according to different characteristics.

Short description of key outcomes to be exploited and the innovation potential

The Weather Forecast Tool (WFT) will provide the user with the first course of evacuation actions at the incident time. With the use of machine learning algorithms and using as input the weather features (e.g. wind speed, visibility) will provide the evacuation actions that regarding the historical data leads to a successful (without any injuries) evacuation of the ship.

The DSS is a tool to assist the captain in the case of an emergency incident. It will provide suggestions on actions to be taken in time of an incident with the help of measures and inputs from various components of the ship and also generate alerts when an abnormal entry is recorded. Additionally, the main scope of this tool is to provide the necessary information in a quick and summarized way to aid the captain in deciding on whether to procced with the evacuation of the ship or not. A user-friendly visual interface will be developed which will contain all the features mentioned above.

The potential customers of the WFT are:

1. DANAOS
2. ANEK

3. OELSR

The DSS's target market will as well mainly be shipping companies or companies involved in the maritime sector. More specifically this asset is utilized when installed on a ship and it is operated by the captain/bridge and in some cases other members of the ship, so it is important to focus on this kind of end users.

Timetable for exploitation

Table 3 KT Timetable for exploitation

WFT Phases	Actions	Dates
Set the framework and first Demo implementation	1. Dataset creation 2. Baselines of the task	Until 11/2020
Finalization of the service	1. Training of the machine learning algorithms 2. Interface creation 3. Communicating the results in social media	Until 11/2021
DSS Phases	**Actions**	**Dates**
Set the framework and Demo implementation	1. Baselines of the task 2. Communicate with other tasks 3. Implement DSS	Until 01/2022
Finalization of the service	Communicate the results in social media	Until 05/2022

Potential risks, barriers or limitations

The human factor at the evacuation process is irreplaceable. So, during the developing of the WFT this issue should be taken into consideration in order for each course of actions to be specified on the special weather conditions that prevail at the time of the incident. Resulting, the maximization of the effectiveness of the module to support the user to take quick and effective decisions. Also, during the progress of the project we may identify needs for extra investments for improving the functionalities of this module.

5.3.3 Concrete exploitation path

Table 4 KT Key performance indicators (Bridge crew)

Excellence Focus	Performance Goal		Progress in comment		Achievement Rating
	Key Performance Indicators	Key Performance Measure	30/11/2020 First Period	30/11/2021 Second Period	
Bridge Crew	Improve the decision-making (accuracy and time for decision-making)	Percentage and Seconds	1. Dataset creation 2. First Demo	1. ML algorithms training 2. Improve the functionality	
	Time to compute the output	Seconds			

Overall Achievement Rating	70% of the First Period 30% of the Second Period

The DSS's measures of achievement will be defined at a later stage in the project. Each measure will be linked to specific goals and to specific KPIs.

Table 5 KT Measurement of achievement (Captain Bridge)

Excellence Focus	**Performance Goal**		**Progress in comment**		**Achievement Rating**
	Key Performance Indicators	**Key Performance Measure**	**02/2022 Start**	**05/2022 End**	
Captain Bridge	decision support (accuracy and time for suggestions and alerts)	Efficiency and Seconds	DSS First Demo	DSS Final Demo	
Overall Achievement Rating					70% of the First Period 30% of the Second Period

5.4 Engitec Systems International Ltd. (ESILimited)

5.4.1 Organization profile

ESI is primarily a company specializing in technical work for the marine, offshore and oil & gas industry. ESI's services include design and finite element analysis of structural components and complex structures according to acceptable international standards and regulations. ESI undertakes telecommunications-related projects, including data transmission over the air, data handling from multiple remote sensor networks and processing. Further to ESI's engagement in design and analysis of structures we are also involved with technical investigations of failures in structures for claims and arbitrations as well as forensic analysis. ESI personnel has extensive expertise in the oil & gas sector related to pipeline engineering, hydrogen related damages in oil & gas facilities and structures and integrity assessment, Stress Corrosion Cracking, non destructive test (NDT) methods of oil & gas facilities. ESI offers, in this particular field, experimental work, both following established standards and specially designed tests which satisfy customer needs, modelling and simulation work for feasibility and validation studies, and field work by experienced engineers. In the PALAEMON project ESI is working on the design of the MEV I and II, with emphasis on the structural design and stability calculations of the two vehicles. The MEV I, being a completely new LB (Life Boat) architecture will be designed with two main characteristics in mind:

- Increased capacity and ease of launch in order to accommodate almost all of the passengers and crew on board large number Cruise and Passenger Ships
- Special design for ease of access and use from people with reduced movability, elderly and people with reduced motor functions.

The MEV II concept is a fairly new design which calls for design of the LB to be a part of the ship, so the MEV II can work seamlessly with the ship when in normal operations (leisure, entertainment. Etc.) ESI will be the main designer of both vehicles, regarding concept design, structural design and stability calculations.

Furthermore, development of a real-time condition monitoring system for global hull girder strength and stability, as well as local defect formation and propagation. This system, although perfectly capable of stand-alone operation, will be paired with the DSS system to offer information about the ship's condition, regarding global strength, local defect-cracks and damages but also offer real time information of roll, trim and the rate of change of these parameters in case of an accident. This will allow for the captain and the crew to make informed decisions in case of an emergency and when paired with other ICT technologies in PALAEMON (e.g. AR) offer additional info for aiding passengers to master stations for evacuation.

5.4.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

ESI will bring the real time condition monitoring system to market after the project's end, with the goal of having market roll out as soon as possible, with the earlier projected date of 3 years after the end of the project. This is with regard to the Condition monitoring system (CMS) as a stand-alone system. In terms of integrating this system with other technologies of the PALAEMON project, the CMS could be offered to be implemented within a general

PALAEMON toolbox, e.g. DSS, PAMEAS and peripheral technologies such as cameras, AR, etc. This toolbox could be marketed to customers as holistic package for Passenger and Cruise ship Emergency system.

Furthermore, the designs of MEV I and MEV II, together with NTUA, ASTANDER and DSB will be further developed for future integration and use in future Passenger and Cruise Ship designs.

Short description of key outcomes to be exploited and the innovation potential

The outcomes are S/w and H/w of the ship's CMS system, as well as the designs and calculations for MEV I and MEV II. The innovation in the CMS is that many CMS systems exist for machinery monitoring but very few for hull strength monitoring, and those that exist (in Container Ships), rely on expensive Long strain gages, which also bear a main drawback the measurements are sound only if the underlying structure is not damaged (e.g. plating). The ESI CMS system does not suffer from these drawbacks and also the local strength CMS can detect a crack wherever it exists within the boundaries of the sensor, without relying on strain gages and expensive and troublesome installation of fibre-optic networks.

Potential addressable market & customers

ESI targets ship operators of all kind, i.e. Tankers, Containerships, Bulk Carriers, Cruise ships, etc. Salvage companies specializing in rescuing damaged ships and salvage of shipwrecks. Offshore platforms are also part of the market.

Timetable for exploitation

After the end of the first periodic report with a preliminary demo and at the end of the project. This will also continue after the end of the project for bringing the technologies to market roll out.

5.5 IOTAM INTERNET OF THINGS APPLICATIONS AND MULTI LAYER DEVELOPMENT LTD (ITML CY)

5.5.1 Organization profile

ITML provides novel, tailor-made software solutions based on a variety of technologies, such as big data analytics, advanced data mining and machine learning. ITML's vision is to deliver products and services close to the real customers and market needs, ultimately improving the user experience and the access to technology. ITML solutions cover a very wide range of applications, including e-shops, e-learning, Business Process Management (BPM), or any other customized application.

The primary competence of ITML relies in the design and development of software prototypes based on technologies that include machine learning algorithms, advanced data mining techniques, data aggregation and data analytics in IoT systems, as well as visualisation tools; all of which are applied in different operational domains, such as energy, logistics, health, education, maritime, and security.

Specifically, in PALAEMON project, ITML has to tackle the following objectives:

- The customization and deployment of a data fusion middleware able to handle complex critical events from multiple data streams. This middleware / messaging bus will be responsible for the pre-processing and providing data to the modules deployed in WPs3-5. It will be based on the customization of ITML's Data Fusion Bus, that carries out data fusion for multiple modality data streams.
- The development of the interoperability framework between the various PALAEMON components by designing common interfaces (APIs) and providing adapters for modules to connect to DFB.
- The development of Human-Machine Interfaces (HMI) and a virtual control room between the field crew and the bridge, using AR. HMIs are essential resources for crew members, who use them to review and monitor different processes, diagnose problems, and visualize data. HMIs can be used to (i)visually display data, (ii) track evacuation time, crew force, evacuation area, (iii) oversee KPIs and (iv) monitor sensors inputs and outputs.

5.5.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

ITML aims to exploit the outcomes of PALAEMON, to enhance its market position with respect to intelligent management of advanced evacuation methodologies, as well as on providing security services in multiple domains. Moreover, ITML will exploit the project's findings in enhancing and strengthening its positioning within the EU market and research domain, establishing partnerships and agreements for further collaborations with the large corporations participating in PALAEMON.

ITML will exploit its existing dissemination channels (partners, Twitter and LinkedIn accounts) as well as its expertise as Dissemination Manager in large EU-funded projects (e.g. I-MECH project under the Ecsel JU funding scheme) to ensure maximization of the communication of PALAEMON outcomes.

Short description of key outcomes to be exploited and the innovation potential

ITML's Data Fusion Bus enables organizations in developing, deploying, operating and managing a big data environment with emphasis on real-time applications. It combines the features and capabilities of several big data applications and utilities within a single platform. ITML plans to use DFB to support a Big Data as a service solution that is currently implementing.

Potential addressable market & customers

The key capabilities of DFB are: Smart Production Digitisation and IoT, Data aggregation from heterogeneous data sources and data stores, Real time analytics offering ready to use Machine Learning algorithms for classification, clustering, regression, anomaly detection, An extendable and highly customizable User Interface for Data Analytics, manipulation and filtering. The UI also includes functionality for managing the platform, Web Services for exploiting the platform outputs for Decision Support. Due to the range of its usage, Data Fusion Bus, can be deployed in a series of platforms that are in a need of these kind of services. To be more precise, DTF could be a potential solution for data aggregation and real time analytics to industries like: Energy, Maritime, CyberSecurity, Big Data, Automotive and Healthcare.

5.5.3 Concrete exploitation path (to be updated in several iteration along the project)

At this stage, a high-level business plan is been put together with the aim to be updated and further elaborated with the provisions and progress of the PALAEMON project.

The planning and objectives, so far can be summed up as follows:

Mission Statement:

Develop, deploy, and maintain a feasible data fusion solution engineered and oriented towards added value for data management and exploitation. Enrich and re-enforce ITML data analytics framework offer.

Strategic Objectives

A. Establish fully productive deployment of the solution in key industry players. Leverage the consortium's Industrial Partners and ITML R&D and commercial ecosystem.

B. Achieve and attain sustainable market growth (customer acquisition and revenue)

5.6 Johanniter Osterreich Ausbildung Und Forschung Gemeinnutzige GMBH (JOAFG)

5.6.1 Organization profile

The Johanniter Research and Innovation Centre is part of the Johanniter Österreich Ausbildung und Forschung gem GmbH (JOAFG), active since 2012 and focused on the knowledge transfer from emergency response units to technicians and technicians to FR, with the mission to find innovative and sustainable solutions for existing problems and investigate new approaches for Johanniter in their service branches. The researchers at Johanniter have a strong focus on methodology and applied science for health, mission tactics, FR equipment and strategical development of situations.

The transfer from project developments and achieved knowledge to practice is done by training **emergency medical technicians** for their duty, on new equipment and tactics, re-certify on new algorithms, increase safety, quality and efficiency of the services provided by Johanniter. These services are i.e. **emergency medical care and ambulance service, disaster relief (medical, USAR), mobile care, palliative care, youth work and community care**.

Within the last 7 years **from personal protective equipment up to C4C systems** were co-designed and tested in several settings from basic usability testing up to large scale exercises for testing concepts and products between TRL 4 to TRL 9.

In 2019 Johanniter in Austria had **31,483 emergency medical interventions** and 92,811 patient transports. 67 cars are dedicated for emergency support and patient transport. 2,794,910 km per anno were driven by Johanniter to support the EMS in 2019 in Austria. 20,788 people were trained by Johanniter in emergency support and first aid.

The JOAFG is the research, education and training facility of JUH and JOAFG are active in European projects since 1992, specialized in curricula development and exploitation incl. dissemination. As a member of Johanniter International network, JUH but especially JOAFG is providing expertise in research activities to other Johanniter organizations across Europe and is supporting Johanniter International and its members to engage research activities and proposals for H2020. It is also a purpose of JOAFG to inform and to transfer results of research projects to the Johanniter Community across Europe, Australia and Northern America.

5.6.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

The main focus for JOAFG in exploitation lies in the field of curricula development and training as a service. Therefore, JOAFG is developing within WP9 the PALAEMON Operational Centre and Training Academy Program. This training program is devoted to the delivery of First Aid, evacuation handling for crewman, passenger support during cruise and evacuation and training with virtual reality for search patterns, cooperative search, command of evacuation drill. Therefore, JOAFG is aiming at three exploitation areas:

- PALAEMON Operational Centre & Academy Training program
- Train the trainer handbook
- Moodle discussion forum

JOAFG will provide competences in first aid training, disaster management training, expertise on the handling of casualties and especially seniors during a crisis.

By this JOAFG is positioned as an active supporter and maintainer of knowledge and expertise during the follow up time of the project.

The basic product for JOAFG will be the training curricula for crewmen about first aid, carrying, safeguarding, and transferring of people with limited mobility and VR training for evacuation of a ship.

Short description of key outcomes to be exploited and the innovation potential

PALAEMON Operational Centre & Academy Training program

The training program will incorporate first aid training, handling of stressed patients, and handling of passengers in panic, crowd control and mobility support. These topics will be trained on operative level and tactic level. Operations and tactics will be trained in a virtual ship model.

The Operational Centre and Academy Training program is highly mobile and can be put in place across EU and abroad.

All trainings will be held in English.

Additional to the basic curriculum, PALAEMON will provide the focus on the introduction of trainers and trainees to intelligence-led ship evacuation operations, preparation for practical application on sea and lake related first aid and response, new strategies for mass evacuation and crowd control in extreme situations and handling and transport of people with special needs.

Train the trainer handbook

This handbook is a guidance for sustainable use of the PALAEMON curriculum, including scenarios, technical background and specialised trainer tools. By this, structured training guidelines and content to support trainers is compiled to a handbook and central source for a train-the-trainer approach and standardisation of training.

Moodle discussion forum

The Moodle based discussion platform allows an exchange of lessons learnt and related issues to evacuation processes on sea and first aid on sea and lake as well as mobility support for people in need of assistance on ships. The forum, by nature, provides the chance of networking in a community of authorized experts and to profit from experiences of others.

Potential addressable market & customers

Trainers, trainees (ship crew members)

Timetable for exploitation

Under consideration

Potential risks, barriers or limitations

COVID related impact on tourism

5.7 National Technical University of Athens. (NTUA)

5.7.1 Organization profile

The National Technical University (NTUA) is the oldest and most prestigious educational institution of Greece in the field of technology and has contributed unceasingly to the country's scientific, technical and economic development since its foundation in 1836. The scientific staff in the Schools, together with post-graduate researchers, apart from their teaching and related educational activities, conduct research work assisted by postgraduate students and a considerable number of external collaborators; the amount and the high standards of this research is proved by the numerous publications in International Scientific Journals and Proceedings of International Conferences as well as by the prominent place of NTUA among all European Universities, due to the increasing number of research projects financed by the EU and other Greek and foreign organizations of the public and the private sector.

The School of Naval Architecture and Marine Engineering (SNAME), was founded in 1969 and teaching commenced during the academic year of 1969-70. Ever since its inception, the School has been heavily involved in research activities. Following Greece's rich maritime tradition, SNAME is active in practically all areas of maritime transport R&D. NTUA-SNAME has substantial experience in the following scientific domains (indicatively): ship-design, design, development and simulation of maritime and intermodal transport, risk analysis, cost-benefit analysis, financial analysis, optimization of logistical systems, Life Cycle Cost analysis (LCC), Life Cycle Analysis (LCA), business process modelling, and dissemination activities. Apart from issues related to shipping operations, NTUA-SNAME’s research also includes issues related to the human factor (i.e., seafarers & passengers onboard) for both routine and emergency situations, Human Centred Design (HCD), Non-Technical Skills (NTS), and issues related to stress and fatigue. NTUA-SNAME has also completed or is involved in numerous EU and National projects in areas such as technology, management, economics, telematics, environment and safety. It has also been involved in projects and studies with a substantial policy analysis element.

5.7.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

NTUA's exploitation plan includes actions regarding the strengthening of the PALAEMON on- going research, the communication between the academic and maritime communities and the transferring of knowledge to undergraduate and postgraduate students. The project results from the NTUA’s side will be used for academic and research purposes in general. First of all, the results will be used for educational purposes, by integrating them into undergraduate and postgraduate courses. In addition, the results will be used for research purposes as well, by using them for PhD researches, surveys and publication of papers in journals as well as scientific conference participations. Moreover, the outputs of PALAEMON project will be utilized for the conduction of academic seminars and workshops. The outcomes of the project will be presented to undergraduate students, postgraduate students and people of the maritime domain with workshops and seminars, in order to familiarize with the innovative technologies that are coming up through the work done in PALAEMON. NTUA-SNAME aims to utilize the knowledge that will be gained for supporting decision making in the maritime industry. NTUA will contribute in the value chain of the project by helping in the design and establishment of innovative technologies in the maritime domain.

Short description of key outcomes to be exploited and the innovation potential

As mentioned above, the main goal is to pass on knowledge to undergraduate and postgraduate students for aspects concerning the innovative ideas of the project, such as the way the Smart Risk Assessment Platform (SRAP) works. In more detail, the component that NTUA is developing is the Smart Risk Assessment Platform which will be a Real-time Risk-based monitoring tool to assist the Master for: 1) the initial assessment of the situation, 2) the evaluation of mustering process, 3) the decision to abandon ship. It will utilize basic risk assessment approaches for calculating the likelihood and the consequence severity. The outcome of the SRAP will be a color-coded Risk Indicator on the PALAEMON dashboard.

The ultimate goal besides transmitting the knowledge to young naval architects and marine engineers in order to be ready for the demanding maritime domain is to use their force to possibly grow or evolve new ideas. Moreover, besides the above-mentioned actions and goals, NTUA intends to exploit the innovations of PALAEMON for the evacuation systems to the academic as well as maritime community.

Potential addressable market & customers

NTUA will mainly focus to the academic community, e.g. undergraduate and postgraduate students and PhD candidates as well. These groups and entities will make concrete use of results. By transmitting new information to the above-mentioned groups of the NTUA the innovative outcomes of the project will be spread and create more chances and opportunities for publications in well-known scientific journals, and conferences which will help the results to be exploited to the academic community.

Timetable for exploitation

After the completion of the PALAEMON project, the outcomes could be incorporated into existing courses. In the meantime, research from the completed deliverables will be used for publications in scientific journals and for presentations in conferences. In addition, workshops and seminars could be organized before the completion of the project, in order to present the results of PALAEMON project to students and people of the maritime domain, get their feedback but most importantly familiarize them with the innovative technologies and methods which are rising through it.

Potential risks, barriers or limitations)

The worldwide phenomenon of the COVID-19 virus spread has affected the normal conduction of conferences. Unfortunately, as long as the restrictions on congestion apply, it will be difficult to hold any conference under normal face to face circumstances. This situation can be faced temporarily by preferring publishing papers to scientific journals or in virtually conducted scientific conferences.

5.7.3 Concrete exploitation path

Goals

The goal of NTUA from the aspect of the exploitation is to disseminate the results to the undergraduate and post graduate students by transmitting as much information as possible through specially designed courses. In that way the skills and knowledge of the above mentioned NTUA members will improve, shaping more skilled and informed people for the maritime domain, increasing the possibilities of creating a better or new invention, innovation, or prototype by their work or possibly their academic research. Another key point

is the successful transfer of the outcomes to people of the academic community who can really make the best out of it and have the potential to take it even further hopefully through administrative deliverables, reports, dissemination materials and publications. In this way the impact of research will be maximized.

Work done and achievements

On November 25, 2019 (M6 of the project), NTUA coordinated a workshop on evacuation, which was hosted by ANEK onboard their Ro-Pax Ferry “KRITI II” that was moored at the Port of Piraeus (Greece). The purpose of the workshop was to collect information regarding the ship evacuation process, identify potential problems and areas for improvement of the current systems and procedures, elicit the needs and expectations of the stakeholders (consortium partners and guests), and map realistic use cases.

The workshop included forty-four (44) representatives of stakeholders both within the PALAEMON project consortium and external guests who offered valuable feedback.

KPIs to measure the achievement

Three KPIs that can be used to measure the achievement are the number of publications in scientific journals, the number of papers presented in conferences and the number of participants of the upcoming seminars and workshops that would be organized, possibly not face to face due to the measures preventing the COVID-19 virus spread.

Roadmap

NTUA is planning to publish a literature review paper based on the D2.1 deliverable “Report on the analysis of SoA, existing and past projects/ initiatives”. In addition, it would be legitimate to publish at least one paper concerning the systems engineering and the overall architecture of the project’s components and at least one for the Smart Risk Assessment Platform (SRAP).

5.8 ADVANTIC SISTEMAS Y SERVICIOS SL (ADV)

5.8.1 Organization profile

Established in 2009, ADVANTICSYS is a high-tech SME specialized in the field of monitoring and control systems with an important background in the field of Internet of Things (IoT) comprising hardware, embedded software and cloud solutions development. Its main market niches are in the field of energy, environmental monitoring, and industrial processes automation. Thanks to its solid technological background, its collaboration network (including Asia and Latin America), and its highly skilled multidisciplinary professionals it is capable of offering its clients competitive and effective technological solutions in more than 40 countries, also participates in R&D projects at National and European level in different areas such as: Internet of Things (IoT), Big Data and innovative software technologies, including fog/edge/cloud architectures for applications in industrial sector. Business Development Possibilities

Identification of individual exploitation possibilities for the project

ADVANTICSYS is an IoT solutions provider, not only selling hardware but also complete services including cloud solutions for dedicated market niches. Within PALAEMON, ADVANTICSYS will be focused on the development of smart bracelets enabling indoor location services among others.

Short description of key outcomes to be exploited and the innovation potential

Smart bracelets shall enable localization and tracking of every person on-board the ship (passenger and crew). A 5G-based device will be created. It will transmit real-time signals, subsequently used for the localization of each passenger during evacuation process. It will also monitor and provide basic information regarding the health condition (heart rate, temperature, etc.) of every person on-board. It is foreseen that this product by itself might be commercialized as stand-alone solution or as part of a complete PALAEMON system.

Potential addressable market & customers

At a first stage, shipping companies will be the main target for the commercialization of the smart bracelets. Especially, the companies involved in the consortium will be the initial potential customers to be addressed. Additionally, smart bracelets could be offered to other customers within our current company channels such as those from Industrial and Construction sectors and any other hazardous environment

5.8.2 Business Model Canvas for Smart Bracelets

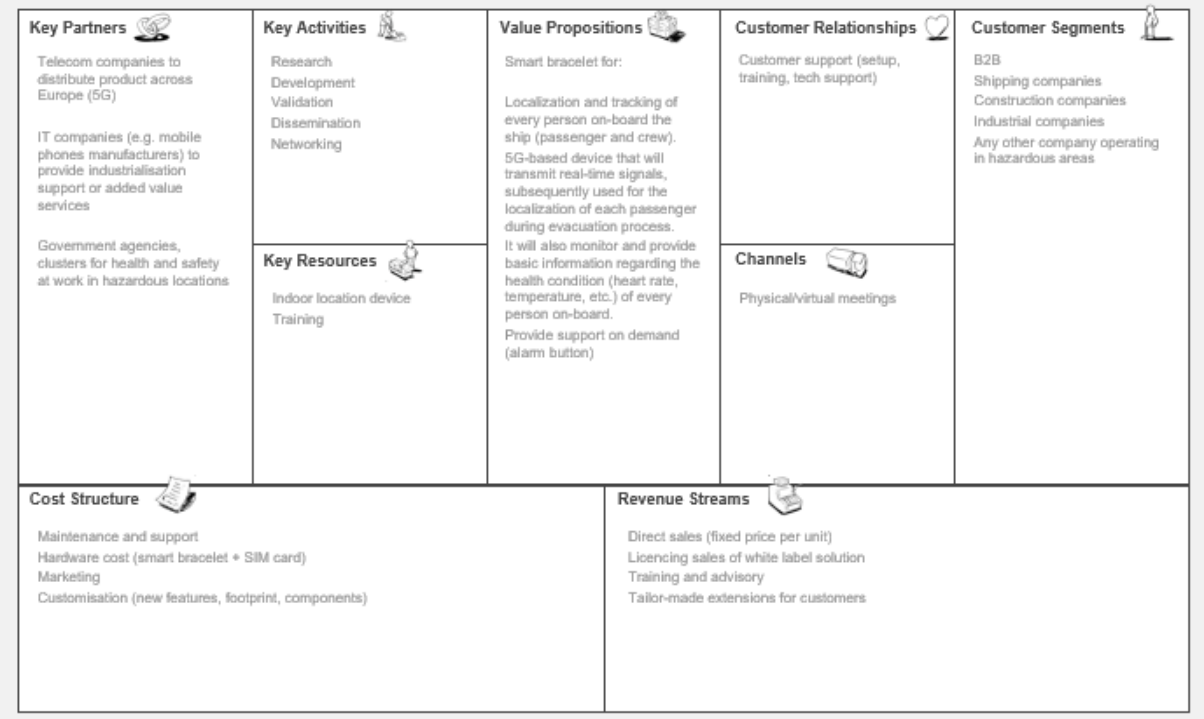

Figure 2 Smart Bracelets Business Model Canvas

5.9 Software Imagination & Vision S.R.L. (SIMAVI)

5.9.1 Organization profile

Software Imagination & Vision S.R.L. (SIMAVI) is a large company, a newly established spin-off company of SIVECO Romania SA – a large software company established in 1992. SIMAVI has inherited all the assets related to the software development activities, the related experience in the field, the implementation teams, the certificates and the authorizations held by SIVECO Romania SA.

SIMAVI has taken over also the software products and projects' references from the following fields of activity: R&D, Education & Training, eHealth, Security, Customised Applications, ERP & BI, Customs, and Government.

SIMAVI will pursue with a significant experience and an exceptional track record in R&D&I projects, being involved as technological provider and as coordinator in many European and national research projects.
Moreover, SIMAVI will continue the outstanding reputation of SIVECO, in international markets, by developing successful projects together with several international companies. SIMAVI provides services on the whole life cycle of projects: analysis of users' requirements, design, development, testing, implementation, end-users training and technical assistance, and system maintenance.
SIMAVI staff consists of IT specialists covering all stages of projects development: analysts, business consultants, system architects, programmers for different platforms, implementers, testers, DBAs, data analysts, accredited trainers.

5.9.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

SIMAVI 's direct contribution in the PALAEMON project revolves mainly around the integrated use of AR / VR technologies within the PALAEMON Academy. LMS and LRS design and configuration expertise is another core input for the architecture. Possible commercial applications and exploitation opportunities rely mostly in the education or training sector, where there is a growing need of blended and augmented reality learning environments.

For example, in this direction, SIMAVI could provide in a given commercial or research project, the consultancy and guidance in the use of AR and VR covering essential project elements such as: AR/VR architecture concept development; integration with additional systems; learning paths advisory; scenarios design; 3D layouts development and synchronisation, LRS and LMS setup and monitoring, etc.

Short description of key outcomes to be exploited and the innovation potential

Outcome 1 **AR/VR Expertise**	The AR/VR expertise gained, will provide the ability to suggest, design and implement such solutions on a variety of projects and applications in the educational field or other R&D environments. AR and VR have the potential to shorten the learning lead times and considerably improve ROI, retention, engagement, mistake opportunities, or learners confidence but also to facilitate just in time content and feedback delivery.
Outcome 2 **Academy Ecosystem Development**	The Academy Ecosystem will behave as a hub of expertise, knowledge and practices, that will centralise and standardise a variety of maritime safety scenarios. Interdependent with outcome 1 and 2 , the scenarios will be used to train, experience and simulate the targeted users with the aim of reducing various risk factors and improving specific metrics in this industry.

Potential addressable market & customers

Market and customers **AR/VR solutions**	Such technologies could be potentially applied in a variety of industries; projects and setups. The versatility of AR and VR learning and simulation makes them applicable on wide areas of learning and training. Marine companies and their training centers, could potentially use this asset to provide better training for their employees either for regular learning paths or bespoke scenarios. Moreover AR /VR learning tool could be used not only for staff but also for customers and passengers altogether.
Market and customers **Academy Ecosystem Design**	The Academy Ecosystem will have a narrower market applicability compared with the first two outcomes. However, the architecture design could be potentially applied to a variety of R&D projects that aim continuous learning of staff, safety and hazard training, integration of AR/VR and LMS subsystems, etc. Furthermore, the model could be replicated or used as a benchmark for bespoke research initiatives.

5.10 DEUTSCHE SCHLAUCHBOOT (DSB)

5.10.1 Organization profile

DSB Deutsche Schlauchboot GmbH, Germany, is part of the Survitec Group.

Survitec, a leading global provider of critical survival solutions.

The widespread design, manufacturing and servicing capabilities are focussing around Marine, Energy, Aviation and Defence.

More details can be found on www.survitecgroup.com

5.10.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

Survitec is having a well-established network of contacts into ship owners and ship yards worldwide.

Short description of key outcomes to be exploited and the innovation potential

Explore the possibility of using PALAEMON as a state-of-the-art addition to established rescue devices.

Potential addressable market & customers

Survitec / DSB will need to team as junior partner with the infrastructure provider for the MEV design, production and marketing.

Timetable for exploitation

Timetable is likely to be 2-3 years after completion of the current study.

5.11 JADE HOCHSCHULE WILHELMSHAVEN/OLDENBURG/ELSFLETH (JHS)

5.11.1 Organization profile

Jade University was founded in 2009 by merging two technical colleges. Jade University is able to provide the very latest teaching concepts as well as experience and solid expertise stretching back to educational institutes from 1932. Jade University is divided on 3 Main campus Oldenburg, Wilhelmshaven and Elsfleth. The Maritime and Logistic Department stationed in Elsfleth is involved within the PALAEMON Project in various Roles which can provide the partners and the project objective with best outcome definitions and results. At Jade University of Applied Sciences, what makes teaching and research stand out are innovative approaches, cooperation that gets you ahead and a supportive environment. In all areas, the university applies its Principles of expertise and variety. Its focus on practice, close contacts with business and graduation within a reasonable timescale have placed it highly in ranking tables for years. At the maritime and Logistic Department there are various of courses of studies available which have a joint program with research and future implementation for maritime branch. Elsfleth also developed a maritime sector which have its strength into researching for various areas such as shipbuilding and maritime systems engineering, maritime infrastructure and logistics, maritime training and education, maritime technologies and maritime environmental protection and climate change. We seek continuations new implementation of research results and including students, researchers and partners worldwide to offer innovative, secure, and safe maritime future.

5.11.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

Jade University is a non-profit organisation, therefore there is not real possibility to provide a business model for the research results. There are on the other hand restriction for patent for the developer to keep their rights and exploited research sources within the school administration. We do value on otherhood eagerly to comprehend our results with other partner and researcher in order to develop the research method and results. Jade University can offer expertise, consulter and research partner in a valued business model.

Short description of key outcomes to be exploited and the innovation potential

Jade University is targeting 2 main components that have been noticed by our researcher and expertise through various cases managing evacuation on Passenger vessel. The first one is the Smart Safety System, which give the captain and the officer an overview of the evacuation condition in real time. That should reduce the overload on the communication methods on board like Very High Frequency (VHF) and give the crew access for operational method and evacuation statements. On the next target for Jade University is managing ship structure stability in case of ship damage to support management level with accurate and real time data to assist them with their decisions.

Potential addressable market & customers

The developed assistance system will be tested by the end users (management level and operation level crew on Board) and also provide insights how far this system can evaluate the decision ability for the crew!

Timetable for exploitation

The whole project activities are divided in 2 different stages; the first one is to provide a testing standalone assistance system and see through testing how the income and in the

second Phase, they should be the compatibility with different subsystem that either available already on board or with newer one that have been developed within the PALEMON Project.

5.12 ERICSSON HELLAS SA TILEPIKOINONIAKOY ILINOX (Ericsson Hellas)

5.12.1 Organization profile

Ericsson (Telefonaktiebolaget LM Ericsson) is the largest supplier of mobile systems in the world. The world's 10 largest mobile operators are among Ericsson's customers and some 40% of all mobile calls are made through Ericsson systems. Ericsson currently provides managed services to networks that serve one billion people. Ericsson has been active worldwide since 1876 and the company has today around 114,000 employees in more than 140 countries. It is listed in the Stockholm Stock Exchange and in the NASDAQ New York. Its headquarters are located in Stockholm, Sweden.

Ericsson Hellas S.A. is an affiliate of LM Ericsson AB and was established in Greece in 1979. Ericsson Hellas today employs more than 170 highly educated employees and is the Hub for the company's operations in Greece and Cyprus. For the past 38 years, Ericsson Hellas has been a key ICT market player in Greece, having greatly contributed to grow and develop the ICT industry in Greece, consistently investing in the Greek market and in local talent.

5.12.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

Ericsson's Business Possibilities are referring to the challenge that is critical to all 5G value chain actors providing reliable End-to-End (E2E) network environments for timely validation of innovative 5G services and applications. This project will contribute to the widespread development of 5G end-to-end networks in several industries. This will be done by offering all 5G experimenters a 5G end-to-end installation, which will allow them to validate the performance of 5G-ready technology solutions before 5G networks are commercially available.

Short description of key outcomes to be exploited and the innovation potential

The key outcomes are presented below:

- Applications of 5G technology in emergency evacuation systems
- Develop innovative technologies for sensing, people monitoring and counting and localization services as well as real-time data during accident time
- To be integrated into an independent, smart situation-awareness and guidance system for sustaining an active evacuation route for large crowds.

Potential addressable market & customers

- Cruise companies
- Indoor buildings (industrial spaces, malls etc)

Timetable for exploitation

The installation, integration and deployment of the solution that Ericsson will provide, requires in total 2-3 months since the proposed ship(to demonstrate PALAEMON) by ANEK will be accessible.

Potential risks, barriers or limitations

From Ericsson's side, there is no limitation or any potential risk to consider. The external limitations that may delay the deployment are in relation to the:

- Position System, in cooperation with PaMEAS
- Access to the ship of ANEK

5.13 Romanian Naval Authority (RNA)

5.13.1 Organization profile

Romanian Naval Authority is a specialized executive agency subordinated to the Ministry of Transports, playing the role of state authority with the purpose of ensuring safety of navigation.

Romanian Naval Authority is a self-financing institution, with legal personality, based in Constanta Port Enclosure, established by merging the Civil Navigation Inspectorate and the Romanian Register of Shipping.

RNA role will not confine itself only on maintaining the safety and security standards on its field of activity. It will also actively involves in promoting and sustaining the naval transports operations, so that will minimize at the lowest the bureaucratical impact on the system, will provide technical assistance and promote worldwide the Romanian naval transport image. Our motto "Safety through Quality" best illustrates RNA's vision to become a leader in safety and security of naval transports, by the high quality of the services provided and professionalism of the staff.

5.13.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

For RNA as public authority, business development is not its main field of interest as RNA activity does not imply any economic interest. However, we find to the following, as main paths, of fruitful business development and objectives we try to reach through this project:

- Safe environment for passengers and crew members;
- For rescuers, cooperate with the provided equipment;
- To keep the safety level as high as possible and comply with regulations;
- Safe practice in ship operation;

Short description of key outcomes to be exploited and the innovation potential

For RNA, the main outcome is the creation of tailored intelligent evacuation services, in the context of IMO requirements and the corresponding national and European regulations and polices. In this context, at least 5 scenarios/services/applications will develop and integrate.

Potential addressable market & customers

The project's results will be used by RNA for the development and enhancement of best practises in relation to passenger ships safety as well as the base for drawing future related regulations.

Timetable for exploitation

RNA exploitation plan will be in line with future legal developments in the field of passenger ships safety.

Potential risks, barriers or limitations

N/A

5.13.3 Concrete exploitation path

Developing and integration of 5 scenarios/services/applications in accordance with project activity timetable, during M32-M36.

5.14 DANAOS SHIPPING COMPANY LIMITED (DANAOS)

5.14.1 Organization profile

DANAOS Shipping is the vessel manager of DANAOS Corporation, a leading international owner of 60 containerships. DANAOS is chartering containerships to a geographically diverse group of liner companies, including most of the largest ones globally. DANAOS Shipping has established its reputation worldwide by providing first class operation service to many of the major container sea carriers.

DANAOS is strongly investing in research and innovation. Organization has been actively engaged in both bona fide and applied operation research through its prestigious research and innovation hub, DANAOS Research Centre (DRC). DANAOS has been participating in more than 30 EU projects, funded under different EU research programs, with a strong motivation to apply innovation and creative thinking across all aspects of maritime operation. DANAOS is a laureate member of FRANZ EDELMAN academy and winner of the homonymous award in 2012 (the highest worldwide distinction in applied operation Research).

5.14.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

DANAOS is engaging in sea cargo transportation. As an organization stands as prestigious provider of shipping service the quality of which meets high standards in safety, security and environmental aspects. DANAOS is continuously looking at improvements on safety standards bundled with technology advances. In this context, organization is highly investigating project results in terms of exploiting over a comprehensive emergency end evacuation ecosystem comprised of various technologies. PALAEMON ecosystem is demonstrated in passenger vessels. DANAOS will investigate means of exploiting and adapting technology to the needs of large ocean-going cargo ships that company operates.

Short description of key outcomes to be exploited and the innovation potential

PALAEMON will provide a digital assistance to the Captain to assess emergency situation while offering a bundle of sophisticated technology means to respond to the emergency in the most efficient way. PALAEMON brings digital revolution to emergency response with an aim to safeguard safety on-board. DANAOS will exploit PALAEMON ecosystem in full as far as project outcomes will be configured to address cargo shipping environment.

On top of that DANAOS will assist in the digital transformation of the traditional emergency and evacuation processing. Under this scope, DANAOS will exploit innovation in regards with real time multi-source incident assessment and digitalization of safety procedures and process monitoring. Having said that, DANAOS will explore the possibility to communicate or present to the maritime industry outcomes of PALAEMON projects related to safety management digital processing, risk management intelligence and multi-attribute life cycle assessment.

Potential addressable market & customers

DANAOS in principal will validate and consume rather than commercialize project outcome. However, DANAOS will assist in the communication of project innovation to the maritime community (ship owners/managers/operators)

Timetable for exploitation

Exploitation will be aligned with project development stages. Starting with the exploitation of individual technologies and ending with the exploration of the integrated solution.

Potential risks, barriers or limitations (if any)

5.14.3 Concrete exploitation path (to be updated in several iteration along the project)

Goals

Main goal is summarized as below:

- Investigate means of exploring PALAEMON technology in cargo sea transportation
- Joint or single exploitation of DANAOS' generated foreground within the project in regards with digital Safety management system (SMS tool), weather forecast toolkit and Life cycle performance assessment

Work done and achievements

Work to be done in order to effectively exploit PALAEMON achievements:

- Develop or co-develop technology components (SMS tool, weather forecast toolkit, LCA) and integrate them with PALAEMON ecosystem
- Design path to effectively adopt PALAEMON technology in ship management.

KPIs to measure the achievement

- Incorporation of at least one component/asset of PALAEMON technology to DANAOS fleet

Roadmap

Steps as following:

1. Test and validate PALEMON system,
2. Design effectively the road of adapting technology to cargo shipping standards,
3. Explore technology so to enhance DANAOS procedures in response to emergency on-board

5.15 ENGINEERS FOR BUSINESS IPIRESIES TECHNOLOGIAS KAI MICHANIKIS ANONIMI ETAIRIA (EfB)

5.15.1 Organization profile

Engineers for Business Ipiresies Technologias kai Michanikis A.E. (EFB) is a technology-based SME company founded by post-doc engineers with the aim to provide advanced research, development, and consulting services. The company provides holistic services and products that link entrepreneurship, engineering and sustainability. It is a dynamically growing company based in Thessaloniki, Greece and operating throughout Europe.

EFB's human resources include both business and technical experts, with extensive experience in engineering design, operations management (OR) - related services, development of optimisation algorithms, innovative ICT applications, decision support systems, and integrated sustainability management. EFB's co-founders and collaborators have significant experience in EU funded projects. EFB builds and promotes multi-disciplinary applications of ICT for interfacing three interrelated pillars of development: (i) Engineering, (ii) Business and (iii) Sustainability.

Within the PALAEMON project, EFB's contribution will utilize all three core competences of the company. In more detail

- Dissemination activities powered by the strong entrepreneurship drive of the company. These are not limited to EFB's own activities but include the consortium's collective work.
- Technical expertise in a both hard engineering and soft engineering field, the interior design of MEV I that needs to comply with current standards but also take MEV designs one step further.

5.15.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

EFB will exploit the results of the project at both technical and business level. EFB has a strong background and competences in engineering which are complemented by collaborators that specialize in defining and establishing business models. Therefore, EFB is in position to provide added value products and product/service systems with increased flexibility by combining both tangible and intangible products. Involved in numerous research projects as technical and dissemination partners, exploitable results can be communicated to a wider audience. Especially in KYKLOS 4.0 EFB is both Dissemination Work Package Leader and Exploitation Manager, thus in an advantageous position to promote PALAEMON's advances to important and involved industrial and academic partners creating opportunity for application of the developed solutions as well as further research and refinement of them.

Outcomes of EFB's effort in the project will strengthen the technical and entrepreneurial profile of the company by developing innovative and applicable products within the project. In particular, the engineering and design team will be able to showcase its work in a greater framework, that of the whole eco-system of PALAEMON, and demonstrate the ability to integrate in high complexity projects as well as contributing to the innovation capacity. In turn, engineering projects in need of advanced level services are going to be part of the services offered by the company.

Short description of key outcomes to be exploited and the innovation potential

The interior design of the MEV is going to be EFB's main engineering contribution. The MEV is going to be part of a greater advanced mass evacuation ecosystem that will act as the last shelter provided by the main vessel to its passengers in case of an emergency. The continuity of high-level service provision is of outmost importance. In the same time the MEV needs to satisfy the requirements of the core function of a life-saving vessel. The balance between the two aspects can be achieved by advanced ergonomic engineering and detailed interior design covering all dimensions of such a vessel and its typical use-case scenario. Seating that optimizes limited spatial resources while extending functionality towards groups of people with special needs will be developed. These will be also open to any kind of sensor integration needed by the current or future applications. Furthermore, elements that enhance passenger experience and contribute to establishing a safe and positive environment will be introduced. Summing up, a holistic approach on user experience and requirements will be followed to enable the emergence of a novel interior design of perceivable added value. This will set a new standard in MEV and other emergency equipment design language.

Potential addressable market & customers

Such services in design are of interest mainly to naval architects that are interested in providing highly detailed and defined projects. The main advantage of such a service is the extension of the product from a hard engineering dimension to a holistic approach that outlines exploitation potential to the partner that commissions the engineering drawings.

Besides naval architects, shipyards and companies active in passenger shipping business are going to be interested as this new approach to life-saving vessels begins to become more popular and a contributing factor in potential end-user attraction.

Timetable for exploitation

The exploitation will begin after the first version of the interior design of the MEV will be finalized. This will take place after month 22 as the first version of the designs are going to be drafted by month 20.

The final and most focused exploitation phase will take place after the project's completion, as stated above, when the complete PALAEMON system will be available and EFB's contribution will be showcased within the framework.

Potential risks, barriers or limitations

To design technical objects that comply with regulations is a barrier for innovation, though set for the sake public safety.

However, this leads to the risk of not offering a significantly advanced proposition to the market and thus not justifying the increased cost of introducing new elements to an already marketable product.

The desired outcome of extending the knowledge and experience gained in this project to other applicable fields, might be limited by the specialization level needed to comply with the user needs and the regulations of this task.

5.15.3 Concrete exploitation path

Goals

The main objective is to design a manufacturable and competitively priced alternative to conventional MEV interior while introducing enhanced functionality on both technical and soft factor level.

Work done and achievements

The preparatory work towards this end includes meticulous ergonomic analysis and extensive user identification to reflect the true needs of this system.

Roadmap

The first version of the interior design in digital form will be demonstrated to various stakeholders to receive feedback and further align the development roadmap to stakeholder needs.

5.16 ASTILLEROS DE SANTANDER SA (ASTANDER)

5.16.1 Organization profile

More than 140 years of experience in building, retrofitting and ship repairs have made Astander a shipyard with a high level of international recognition.

Being a reference as a shipyard dedicated to design, repair, conversion and building of ships with the objective of increasing competitiveness, market presence, sales volume, profit and our social purpose as a company.

Astander mission and vision are provide customers with useful products and services which meet the agreed commitments, satisfying the established requirements of quality, environment, health and safety at work.

Astander's facilities are two drydocks with maximum values of:

- Length: 230 m
- Breadth: 32 m
- DWT: 55,000
- Draft: 8.5 m
- Cranes: 200t + 40t + 15t

One slipway, 2 piers, 2 quays, storage place for owners and one workshop of mechanical, steelworks, pipeworks and electrical.

5.16.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

Astander sees the opportunity to commercialize the results of the Project within the shipowners to which it has access, as well as in specific naval clusters that enhance the result by informing and training on the characteristics of the Project, especially highlighting the commercialization of a controlled abandonment system before that such abandonment occurs with new technology integrate on board of vessels like smart bracelets, sensors, and new biomaterials to use in lifeboat to reduce the cost of disposal of the lifeboat, since it is an environmentally-friendly material, being the first time such a boat has been manufactured with this material.

Astander's main role is to integrate safety on board, when people have to abandon ship with a new rescue boat prototype.

Short description of key outcomes to be exploited and the innovation potential

Main component is the manufacture of a rescue lifeboat that it is respectful with the environment at the end of its useful life cycle and integrated into a fast and safe abandonment of the ship according to the new integrated technologies on board.

Potential addressable market & customers

Group of main clients will be shipowners who have ferries or cruises due to the multitude of people they carry or those who have vessels that carry highly flammable materials where evacuations have to be very fast like tankers.

Timetable for exploitation

First phase- communication to the ship-owners and explanation what is PALAEMON during progress the project.

Second phase- at the end of the project and we foresee that the results are exploitable, the results are reported to be favourable to the owners and that it has been obtained in PALAEMON

Last phase- three months after completion put it in the portfolio Astander to be exploited commercially

Potential risks, barriers or limitations

All new technology cannot be integrated in a vessel or price of this integration could be so high that shipowners are not interested.

5.16.3 Concrete exploitation path

Goals

- Integrate PALAEMON technologies into ships or MEV
- Fabrication new MEV with new materials and integrate on board.

Work done and achievements

- Use bioresines in a lifeboat and ergonomic design
- Integrate geolocation to person in a MEV

KPIs to measure the achievement

- technologies on board according to abandonment with the MEV
- time to fabrication MEV
- number of owners interesting in PALAEMON

Roadmap

Firs phase- fabrication MEV and calculation this time for the future reduce this issue.

Second phase- To know the form to integrate the new technology on board and how many it is coordinate with MEV.

Last phase- Talk to owners to assess their interest in PALAEMON

5.17 DNV GL HELLAS SA (DNV GL)

5.17.1 Organization profile

Driven by its purpose of safeguarding life, property and the environment, DNV GL enables organisations to advance the safety and sustainability of their business. DNV GL provides classification and technical assurance along with software and independent expert advisory services to the maritime, oil & gas and energy industries. It also provides certification services to customers across a wide range of industries. Combining leading technical and operational expertise, risk methodology and in-depth industry knowledge, DNV GL empowers its customers' decisions and actions with trust and confidence. The company continuously invests in research and collaborative innovation to provide customers and society with operational and technological foresight. DNV GL operates globally in more than 100 countries with its 16,000 professionals dedicated to helping their customers make the world safer, smarter and greener.

5.17.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

DNVGL's exploitation plan is based on two pillars, safety (reduction of risk) and digitalization. Safety is an inherent part of classification societies, as also identified in the first line of our company's description. At the same time, digital solutions are also in the forefront of our company, even more now during the troublesome times of coronavirus. PALAEMON perfectly combines both pillars by promoting the adoption of smart solution on cruise ships, aiming at reducing accidents, and incidents, at sea, eventually decreasing loss of life, and property, and environmental impact.

From the Classification perspective, DNV GL is strongly motivated to explore new technologies with advanced research and development work, contributing digital and automation expertise to enhance safety, efficiency, reliability and passenger experience, and streamlining class and certification services.

Having approximately the 23.5% of the global fleet in its class, DNV GL is the leading class society and thus its role is crucial in achieving increased safety performance of the global cruise ship industry.

Short description of key outcomes to be exploited and the innovation potential

In more detail, digitalization of many of DNVGL's field work (i.e. surveys) is progressing with a very fast pace, especially now during the coronavirus pandemic, where travel restrictions hinder the physical presence of our colleagues. To this end, PALAEMON outcomes will further support the ongoing developments of digital class and some of implemented solutions may facilitate the communication between shore (class surveyor) and ship.

Finally, the on-going work on PALAEMON and especially the fermentation that takes place during the workshops between partners, will potentially become the outline for future class rules that will be necessary to design and operate innovative solutions, like the ones being developed in PALAEMON.

Potential addressable market & customers

PALAEMON aims at a novel concept in marine evacuation systems by introducing advanced ICT technologies, ship sensor data and big-data analytics for increased safety performance.

Key target group for the PALAEMON developments are passenger vessel owners, yards, equipment manufacturers and ICT service providers.

For yards, moving the technology forefront beyond the spectrum of conventional solutions is important as a differentiation factor, especially for the very demanding cruise vessels industry.

For shipowners, increased safety of passenger services is of paramount importance for high competitiveness and reputation.

For equipment manufacturers and ICT service providers, novel systems are door openers for new markets, ensuring business continuity and sustainability.

Though passengers are part of the end solution, the proposed systems fall into the infrastructure offered to the customers rather than a service that passengers would optionally use (in this case, passengers would be included in the target group as well).

So, for DNVGL the main addressable market and customers will be mainly the cruise/passenger ship sector and secondary yards and integrated solutions providers.

Timetable for exploitation

DNV GL will participate in dissemination activities to exploit the PALAEMON results, in line with the partners' individual benefits and the overall objective of knowledge increase and sharing. The activities foreseen are:

- Participation in International Maritime Conferences related to safety and ICT advancements in shipping.
- Customer presentations dedicated to the PALAEMON results, as well as integrated in the framework of other events.
- Participation in the publication of results via press releases, conference presentations, magazines, etc. The means of publication will be selected and agreed between the partners, with key criterion the maximization of mutual benefits. Intellectual property rights will be carefully handled during dissemination, with the agreement of all partners.

DNV GL is participating in various events in annual or bi-annual frequency:

- Posidonia Exhibition: One of the biggest events for world shipping industry is held every four years in Athens. Next Posidonia is planned for 2020 http://posidonia-events.com/
- Annual meetings of marine technology, Hellenic Institute of Marine Technology. http://www.elintconference.gr/.
- International Marine Design Conference IMDC, performed every 3 years at various places around the globe.
- Annual European Safety and Reliability Conference.
- Bi-annual International Conference on Maritime Technology and Engineering MARTECH.
- Annual International Conference on Computer Applications and Information Technology in the Maritime Industries COMPIT.

The DNV GL team of PALAEMON is regularly participating with presentations and papers in the afore-mentioned events and conferences.

However, due to unprecedent situation of the coronavirus pandemic, several of these conferences and events have been cancelled, and the future ones still being quite uncertain.

Potential risks, barriers or limitations (if any)

The major barrier/limitation may be the unprecedent situation of the coronavirus pandemic, which has led in the cancellation of several of these conferences and events, and the future ones still being quite uncertain.

This is also valid for all the partners participating in PALAEMON, so a solution will be fined during the progression of the project.

5.18 ADMES MONOPROSOPI IDIOTIKI KEFELAIOUCHIKI ETAIREIA (AdMeS)

5.18.1 Organization profile

ADMES will be involved mainly in evaluation and demonstration tasks for the Passengers evacuation scenario contributing to Obj. 5 & 7. Further to this will support the structural monitoring toolkit and the definition of requirements is aimed at the creation of a specification sheet of the motion prediction system to be developed. During this working package a steady and intense interchange between the consortium partners is required to elaborate the desired output of the system in detail. It is targeted at defining the individual subsystems as well as the required interfaces with other systems, e.g. AI-DSS and it will closely collaborate with the ship stability monitoring ecosystem of Task 6.1. This working package results in the performance sheet. The prepared specification and performance sheets will be used as a central guideline for the following work process. During this main package the function modules of the prediction system will be integrated. This will ensure a smooth and reliable communication between individual components and lay the foundation for the development phase. The focus therefore will shift to development of the motion prediction system for the vessel. Next to setting up the environment and a fundamental parameterization of the vessel, the individual modules will be designed. As the components have to interact strongly with each other, the development process has to be run in parallel. After setting up the development environment and a profound hydrodynamic parameterization of the vessel, the individual modules of the system will be designed. Extensive model testing will be conducted at the Maritime Training Centre Wesermarsch (MTZW). This working package is intended to cover the preparation, execution and post processing of these tests. The on-site coordination of tests as well as communication and coordination between the consortium and MTZW is part of this package as well.

This task consists in the adaptation of a fixed wing UAV to accommodate a hyper-spectral camera/ a LIDAR (2 configurations) and the receiver of the bi-static radar). The legacy Ground Control Station of the UAV will be adapted so it can be integrated as part of the PALAEMON communication platform. The task will contribute towards the fulfilment of D5.3.

5.18.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

AdMeS is a Technical Advisor Company providing advanced mechanical services on Maritime and Energy Industry sectors worldwide. It is certified according to the provisions of **ISO 9001:2015 with activities' scope "Services Provision of Preventive Maintenance (Condition Monitoring Services)".** It is specialized in Condition Based Maintenance (CBM), Non-Destructive Testing (NDT), In-Situ Balancing, Alignment and Resonance Fatigue Studies with an important portfolio of Greek and international clients. In cooperation with the Certification Body **CERT1[2]**, it undertakes inspection services as well. Constantly watching the latest technology trends and innovations, the company owns modern equipment in order to take vibration and magnetic measurements following the latest technical methods. Aiming to offer quality services, the company relies on its expanding specialized personnel, which consists of mechanical, automation and computer engineers who receive constant education by attending seminars and specialization programmes acquiring the relevant certifications.

AdMeS undertakes inspection services of critical infrastructure using specialized equipment to cover any possible requirements a Client may request. Its well- trained and certified

personnel with a multi-copter UAV, a dual sensor (optical – thermal camera), a portable handheld thermal camera and many other modern sensors and instruments can scan, monitor and inspect infrastructure like Windfarms, Solar Panels, Funnels and Industry Facilities on land, at a height above sea level and underwater.
ADMES expects that the technologies demonstrated in PALAEMON will attract the interest of relevant solution providers for safety procedures and can initiate new collaborations with industrial partners towards technology transfer and commercialisation. A direct exploitation may be achieved by means of protecting the knowledge created by ADMES in the course of the project (foreground knowledge) through e.g. by patents or copyright and granting licenses for its use, collaboration with the PALAEMON's industrial partners or by participating in a potential joint venture with other project partners. Indirect exploitation may be realised by increasing ADMES's leadership in the respective technology and application areas of research on a European scale.
PALAEMON project is relevant to ADMES in terms of initializing drones and sensors to make the provided services more accurate and advanced.

Short description of key outcomes to be exploited and the innovation potential

The technological effort on the PALAEMON project led to the utilisation of an Autonomous Aerial Drone System, with the appropriate sensors for missions during evacuation. The Aerial Drone System is composed of the drone itself, with sensors and the suite is completed by a Graphic User Interface to easily monitor and control the overall aerial mission. The innovation for the company is that the aerial system will be used for missions required for evacuation and search and rescue procedures. More specifically the company will enhance its' competencies in the following areas: Reconnaissance and Mapping, Structural Assessment; Temporary Infrastructure / Supply Delivery; Search and Rescue Operations

Besides the technical activities, we see great value in the expertise that will be acquired by other partners and the interaction with the Industrial partners. Last but not least, as an inspection company ADMES shall enhance the knowledge that PALAEMON will bring in terms of methodologies for safety, data models analysis and risk assessment which are main aspects of the companies' offerings.

Potential addressable market & customers

Admes intends to exploit the project results via direct industrial use to the companies' customer base. The targeted market consists of the shipping and maritime sector, the energy sector and the critical infrastructure sector. Potential new customers from the above sectors are national and international companies.

Timetable for exploitation

The company already exploits the project results to the current customer base and specific actions have been performed:

- Definition of primary and secondary customers;
- Customer involvement through bilateral meetings;
- Exploitation of all the companies' channels to intercept potential large customers
- Establishment of new potential partnerships.

Potential risks, barriers or limitations

5.18.3 Concrete exploitation path

Admes goal is to expand the project experience and outcomes to all the targeted customers and integrate the drones and sensors use in various business lines.

Work done and achievements

Introduction of the new methods and services based on the work under progress is already presented in current and potential new customers. The company is currently expanding the service portfolio based on the work developed within the project.

KPIs to measure the achievement

- Time to market: integration of similar service to the current projects and projects
- Customers' acceptance and validation – willingness to pay for a new service based on drone usage and sensors.
- Potential new services inline with ADMES business activities.

Roadmap

The introduction of the new services based on PALAEMON experience has already started. The aim of the company is to be able to offer a new service to the market by the end of the project.

5.19 THALES ITALIA SPA (THALIT)

5.19.1 Organization profile

Thales Italia (THALIT) is the Italian subsidiary of the French Thales Group, a leading international company addressing defense, aerospace and security markets worldwide. Thales employs 65,000 people worldwide with annual revenues of €15 Billion and one third of its staff dedicated to R&D and innovation. Thales offers an unmatched capability in Europe to develop and deploy critical information systems and is a world leader in transport and security markets.

Thales Italia develops ICT solutions and services in various business domains including Security, Transportation, Defense and Critical Information Systems, and is an acknowledged international competence center for large-scale projects. Thales Italia employs around 500 people (17% dedicated to R&D) with annual revenues of about €150 million. More than 50 specialists are permanently dedicated to ICT projects, providing software engineering, business applications, IT outsourcing and cyber security solution to a wide variety of customers including government, public administrations and utilities (metro, railways, airports, energy), industry and manufacturing (automotive, multimedia, food) and finance (banks).
Thales Italia's solutions include the ICT platforms and services to implement information & security control centers, on-board systems, mobile broadband communication, video management and analytics, IT systems administration, maintenance and outsourcing, and ICT security management.
THALIT is responsible for the entire Thales Group for the development and production of transport and security solutions and in this role, it has delivered turn-key projects in many countries.

5.19.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

Thales Italia is constantly involved, in its ordinary business activities addressing international markets in more than 20 Countries, in the development and integration of several security systems, committing to the fulfilment of customer critical requirements including interoperability, reliability, security and performance of the solutions delivered.

As common, growing requirement in all the addressed critical sectors, there is a significant need to guarantee security of information and data, while the technological systems used in those sectors are more and more open, standardized and requiring a "cloud" approach. Under these market drivers THALIT has strongly committed itself to develop solutions intrinsically secure in any architecture they would be employed and at the same time to provide our customers with tools that can allow them to flexibly manage also privacy constraints that large data flows can generate. A holistic approach in our systems integration capability in large and complex critical systems allows us to optimize our solutions and to guarantee all key expected capabilities to our customer.

Thales is interested in testing and commercially exploiting the PALAEMON technology in several vertical markets, such as security, defense and critical infrastructure security. By leveraging on the technological solutions developed in the project, THALIT strives to improve its security solutions and building blocks delivered in domestic and international projects.

Thales Italy will address dissemination and demonstration activities considering stakeholders of security and maritime transport markets, selecting best and most relevant events for dissemination, and for planning demonstration activities, and these events will be mainly centred on raising awareness and transfer of knowledge, solutions, and technology.

Short description of key outcomes to be exploited and the innovation potential

Thales intends to consolidate the results achieved by the projects for the VDES prototype that is developed in collaboration with project's partner WISER. This communication system will integrate AIS, VDE and ASM functionalities into one single unit. A main innovation yielded by this system is that the VDES transceiver will be performed following the Software-Defined Radio (SDR) paradigm permitting a flexible and dynamic adaptation and configuration of the solution to the specific market that will be addressed (civil or defense).

Potential addressable market & customers

Civil and defence maritime business with also satellite communications as a further development segment to be addressed.

Timetable for exploitation

Thales will follow its internal quality processes before proposing the product to the business, which are mainly based on the following steps:

1. Technological maturity achieved through an innovation Main Gate performed internally to secure that TRL 5 and guarantee that the level of risks is such that it can be managed by standard product development activities.
2. After a Development Launch review the real product development authorization will be granted by a Thales's internal committee.
3. After an internal Commercial Launch business review the product will be authorized to be proposed on the market.

Potential risks, barriers or limitations

5.19.3 Concrete exploitation path

Considering the current state of the project development and the knowledge of it within Thales, the only foreseeable steps for a concrete exploitation of the project are to increase the TRL and evaluate marketing aspects based on current developments. In future updates it will be possible to provide further specific details.

5.20 Universidad De Alcalá (UAH)

5.20.1 Organization profile

Tradition and innovation are combined in the University of Alcalá (UAH) which dates back to the 16th century, when it was established as a higher education college by Cardinal Cisneros. Today, the University of Alcalá is a modern, medium-sized institution, recognized in Europe and America as a model to imitate. To the classic humanist and social science studies, the University of Alcalá has incorporated the newest degrees in all scientific fields such as Health Sciences or different engineering degrees distributed in its different campuses, which constitute all of them, together with the Science and Technology Park, a decisive factor of international projection and a dynamizing element of the activity in our region.

Its more than 29,000 students, 1,627 professors and researchers and 762 administrative and service workers give life to more than 38 official degrees, a wide range of postgraduate studies and continuing education. The recognized quality of its studies, the development of important lines of research, its international relations, the historical and artistic interest of its emblematic buildings, its new and modern facilities and its complete adaptation to the demands of the current labor market place it at the forefront of public universities.

5.20.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

Particularly the researchers participating in the PALAEMON project are integrated in a research group, GEINTRA, the larger research group at University of Alcala.

The main goal of the GEINTRA research group is to develop basic and applied research activities on issues connected to smart spaces and intelligent transport and infrastructure systems. This general objective includes research lines related to the design and conception of electronic systems, sensor systems and sensory fusion, detection, positioning, and behavioural analysis systems, intelligent transport systems and infrastructure, computer vision and medical imaging, control, automation and robotics, independent living and support products.

The research lines more related with the PALAEMON project are sensor fusion systems, smart infrastructures, systems for detection, positioning and analysis of behaviour and embedded computer vision.

Additionally to publish the results in the journals of greatest impact within the technological area of knowledge, UAH researchers will pursue to extend the project results and give rise to social and/or economic benefits, therefore the research team group from the UAH contemplates the following exploitation possibilities:

- Elaboration and diffusion of the technological offer presenting the smart camera product/service.
- Demonstration sessions
- Agreements with companies (mainly private entities) that show their interest in the results of the project.

Besides, the following is a list of possible dissemination mechanisms, to be used:

- Publication in scientific journals.
- Contributions to scientific congresses.

- Participation in professional forums or congresses.
- Participation in national or international fairs of a professional nature or new technologies.
- Publication in business, professional or sectorial magazine.
- Dissemination via websites, blogs and social networks.

Short description of key outcomes to be exploited and the innovation potential

The main exploitable output is the smart camera node based on an embedded hardware plus the AI computer vision algorithms. In this regard, Smart cameras shall enable the detection and tracking of people in different scenarios: corridors, rooms, large areas. Additionally, each camera node will monitor the people behaviour in order to detect anomalous situation, such as stampedes, multiple people running. Network connectivity and multiple protocols allow the installation as many nodes as needed to secure/monitor a particular installation. Therefore, the smart camera system might be commercialized as a stand-alone solution or as part of the complete PALAEMON system.

Figure 3 shows the Business Model Canvas for Smart Camera System:

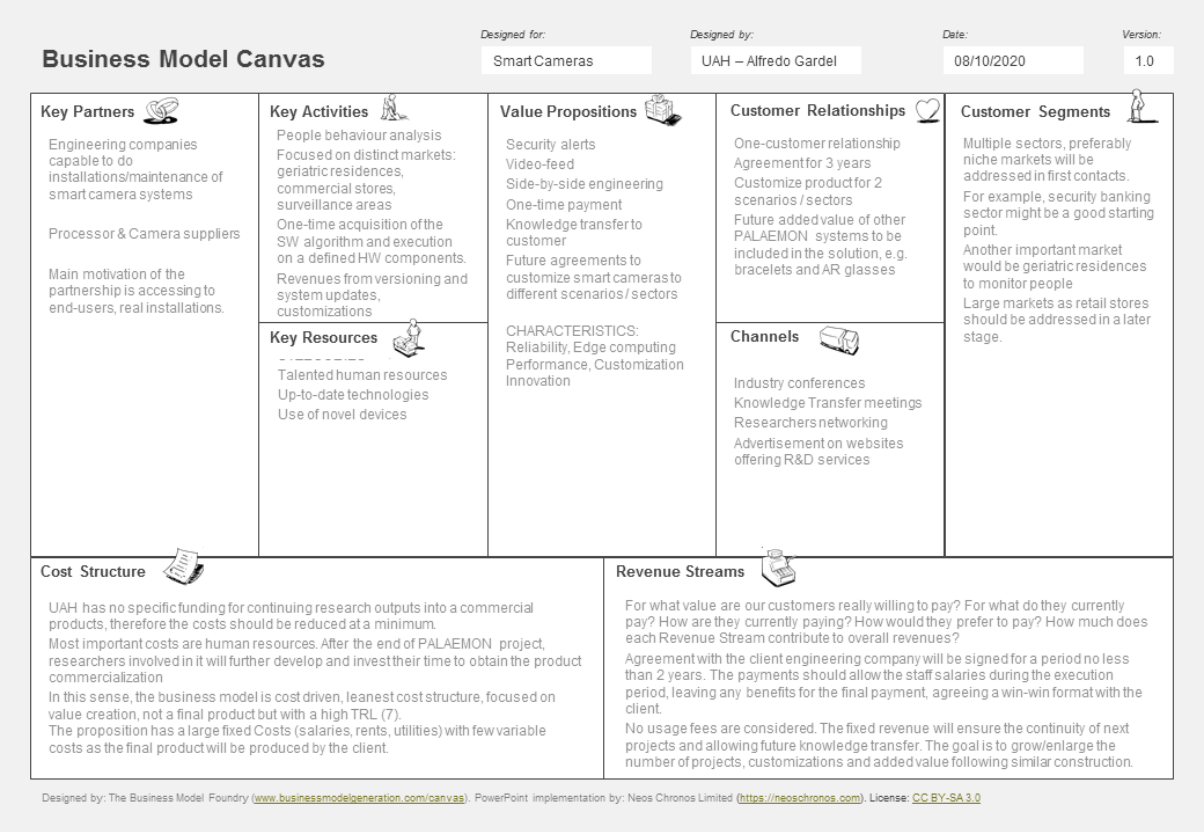

Figure 3 Smart Camera system Business Model Canvas

Potential addressable market & customers

Concerning the commercialization of the Smart Camera System, UAH together with other partners participating in the development, will seek an engineering company capable to do installations/maintenance of the system/technology.

The main motivation of the looking company partnership is accessing to end-users, real installations. Especially, the companies involved in the consortium will be the initial potential customers to be addressed.

The main key activity is to focus in sectors where people behaviour analysis represents a large added value. In this sense, the idea is to focus the efforts on different sectors: geriatric residences, security services, commercial stores, etc. where the surveillance of areas are required.

The pursued selling agreement is a one-time acquisition for the engineering company including both the SW algorithm and its real-time execution on a embedded HW system. This will ensure fixed costs, minimizing risks, seeking future revenues from versioning and system updates, customizations for different sectors.

Timetable for exploitation

The timetable would be to seek for such a distributor/installation company of the system and, one the agreement is signed, work for the customization and features of the first end system.

Potential risks, barriers or limitations

The main risk is obsolescence as innovation/novelties included in the output algorithms executed on the smart camera system will be sooner or later improved by other technological competitors.

5.20.3 Concrete exploitation path

Goals

Knowledge transfer and agreement with an industrial/engineering company the Smart Camera system developed with detection, tracking, counting people and detecting stampede customized for a particular application.

Roadmap

April/July-2021: Demonstration sessions, dissemination of first results of Smart Cameras

Sep/December-2021: Contact interested companies, sign an agreement of exploitation

January/June-2022: Start exploitation works

5.21 University of the Aegean (UAEGEAN)

5.21.1 Organization profile

University of the Aegean (UAegean)[3] has a strong international academic and research profile, having been an active member of the European Universities Association (EUA) and a leading academic and research institution in Greece and abroad. UAegean has received consistently excellent feedback in evaluations that have taken place at national, European and international level, as a result of the study programmes offered by the institution and its competitive research projects and initiatives. UAegean i4m Lab is part of the Financial and Management Engineering Dpt (School of Engineering) and focuses on the design, development, management and use of Information Technology (IT) and IT-based Service Systems in complex organizations, including government, industry value chains and value systems, inter-organizational business processes for SMEs and large enterprises. Recent work includes applications e-identity management systems, Business Process Automation, e-logistics and e-government.Business Development Possibilities.

Identification of individual exploitation possibilities for the project

UAegean plans to use the results of the project in the education of the young engineers and in the education programs of the School of Business (Department of Shipping, Trade and Transport). Besides, the University wants to use the results of PALAEMON to establish as a leading player in the field of evacuation management using the methods and techniques of business process automation and benefiting from the opportunities of 5G networking and the bpotential of Heterogeneous Nets (Het Nets).

Short description of key outcomes to be exploited and the innovation potential

UAegean will focus in particular on the exploitation of the project results related to the high coordination and streamline of the ship evacuation process, as proposed by PALAEMON. More specifically, UAegean wants to implement and promote the concept of Smart Evacuation Management and prove the business potential of Smart Evacuation Management Systems. The term “Smart Evacuation System” is defined at the operational level, as a layer of additional to existing evacuation functionality to allow for technology-aided Evacuation Management in cruise and RoPax vessels. More specifically, it refers to the development of a software suite providing technology-enhanced evacuation possibilities, which can be used by evacuation coordinators to: a) support the effective application of an Evacuation Plan (EP) by providing proper guidance to crew and passengers, b) manage incidents that could possibly hinder the timely execution of the EP from the initial time the incidence is reported to the conclusion of the incidence, c) track the status & location of resources and passengers, and reassess response plans if needed and, d) design and post-evacuation analysis of the response, on the basis of Key Performance Indicators (KPIs).

Potential addressable market & customers

The PALAEMON Smart Evacuation System addresses the needs of evacuation optimization in the specific markets of cruise shipping (where important activity has been transferred in the last years outside of EU) and coastal shipping (where there is a lot of improvement potential for the evacuation process with obvious consequences at the level of passengers’ safety and sustainability of investments).

Timetable for exploitation

The work on Smart Evacuation Exploitation Plan will follow a timetable with specific milestones

- Ship Evacuation Market Analysis with reference to cruise and coastal shipping
- Business Models for a Smart Evacuation Management System
- Market Positioning Actions (includes the promotion of PAMAEMON Smart Evacuation System in industry and engineering forums).

5.21.2 Concrete exploitation path

Goals

The goal of the exploitation plan exercise is to create awareness for the Smart Evacuation Management concept and to reach out to potential adopters, customers while at the same time defining a need for public policy in this regard.

Work done and achievements

a. Document the differences with the existing approaches (optimization of the evacuation process through simulations and by deploying Decision Support Systems) – M14
b. Architecture and Components Design of a Smart Evacuation System – M18
c. Passenger Privacy Management by using Disposable Identities (based on Verifiable credentials and SSI technologies)

KPIs to measure the achievement

1. Publications
2. Presentations in industry and engineering forums

Roadmap

a. Development of an early prototype of a Smart Evacuation Management System
b. Functionality Demo and Feasibility Analysis

5.22 WISER SRL (WISER)

5.22.1 Organization profile

WISER is a small consulting company, whose mission is to provide technical support in the field of signal processing for wireless communications and navigation. WISER team experiments with low cost technologies based on "Software-Defined-Radio" architectures for a number of applications: transmission of digital terrestrial television to vehicles, trucks fleet control through satellite data packets, highly-accurate GPS receivers. The main customers of WISER are both large national and international companies that need to outsource specific highly technical activities, and local smaller companies operating in the field of ICT.

5.22.2 Business Development Possibilities

Identification of individual exploitation possibilities for the project

WISER aims at developing a VDES-compliant transceiver during PALAEMON project. Specifically, WISER has been developing the transmitter and receiver algorithms and their efficient software implementation. These software implementations will be then ported over a COTS hardware platform, composed by an RF tuner and an embedded board. These activities concerning software porting over the COTS platform will be carried out jointly with Thales Italia. The target TRL for the VDES transceiver prototype is TRL 7.

Short description of key outcomes to be exploited and the innovation potential

WISER outcome of PALAEMON project is represented by the knowledge, the algorithms and the software implementation of the VDES transceiver, tested over a COTS x64 architecture. The property of these outcomes is 100% of WISER.A more market-oriented implementation running over a COTS SDR hardware platform will be obtained by modifying the original software (tested over the x64 architecture) during the project, thanks to the joint effort of WISER and Thales Italia. The property of the resulting SW will be shared among the two entities, with percentages to be agreed.

Potential addressable market & customers

WISER is an SME, so it is unlikely to face the maritime market by itself. For this reason, a joint venture with Thales Italia is the target strategy to be followed by WISER. Hence the customer identification will be carried out by Thales Italia.

Timetable for exploitation

WISER and Thales Italia aim at moving from TRL 7 to TRL 9 (product) in maximum two years-time after the end of PALAEMON project. After that period, the VDES transceiver will be ready to be launched on the maritime market.

Potential risks, barriers or limitations

No technical risks/barriers are foreseen as far as the activities to be carried out into the project are concerned. A potential risk lies into the actual capacity of WISER (and/or Thales Italia) to address the reference market of VDES equipment. In this respect, development of professional-grade equipment is foreseen (defence, civil protection etc.).

5.22.3 Concrete exploitation path

WISER is currently facing the development stage within PALAEMON project, so that the concrete exploitation path is too premature at this stage. We plan to have a concrete exploitation plan shared with Thales Italia in 6 months-time.

5.23 Palaemon End users. ANONIMI NAFTILIAKI ETERIA KRITIS (ANEK) S.A. and OESTERREICHISCHER LLOYD SEEREEDEREI (CYPRUS) LTD (OELS)

As end users ANEK and OELS do not foresee any exploitation of the results. They collaborate with the project as follows:

1. Updating the knowledge of the state-of-the-art technologies in PALAEMON
2. Obtaining information to better be able to specify the next generation if systems to be integrated in vessels
3. And/or benchmarking various solutions through the assessment of the system capabilities during the test sessions
4. And/or purchasing systems parts from the project if interesting.

6 PALAEMON Value Proposition and Business Model Canvas

The current section focuses on the presentation of the initial PALAEMON Business Model. To this end, firstly the main customer segment's needs will be analysed using the Value proposition Canvas by Strategyzer [4].

Shipping Companies are considered the PALAEMON main target customer and the initial purpose of this study is to develop an understanding of the customer gains and pains. In other words, the benefits that the customer needs and the problems that the customer faces. These findings are reflecting in the Block customer Profile of the Canvas Value Proposition see Figure 4.

After this the Business Model Canvas is presented see Figure 5, this introduces the Initial PALAEMON Business Model, the model establishes the foundations that will evolve along the project.

To end the section, the three central value propositions provided by PALAEMON are analysed using the Value proposition Canvas building block called "Value Map". These values are (See Figure 6,Figure 7,Figure 8):

- Smart Evacuation Management System (all technologies included)
- MEV I and MEV II
- PALAEMON Academy

6.1 Shipping Companies Profile

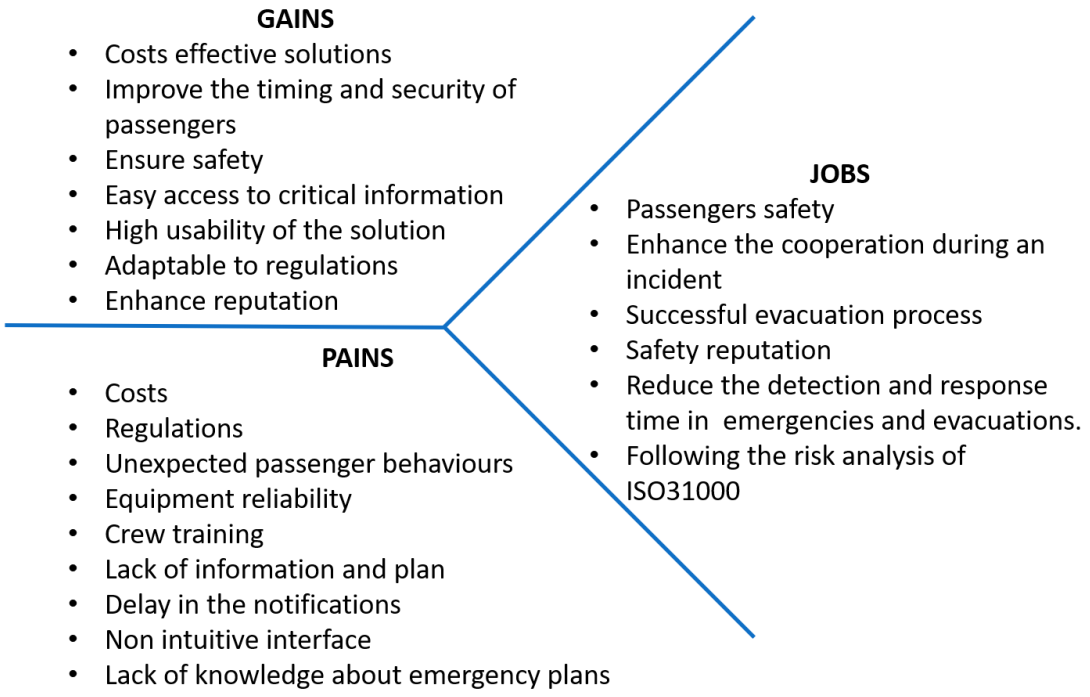

Figure 4 Shipping Companies Profile. Building Block Customer Profile using Value proposition Canvas by Strategyzer.

6.2 Business Model Canvas

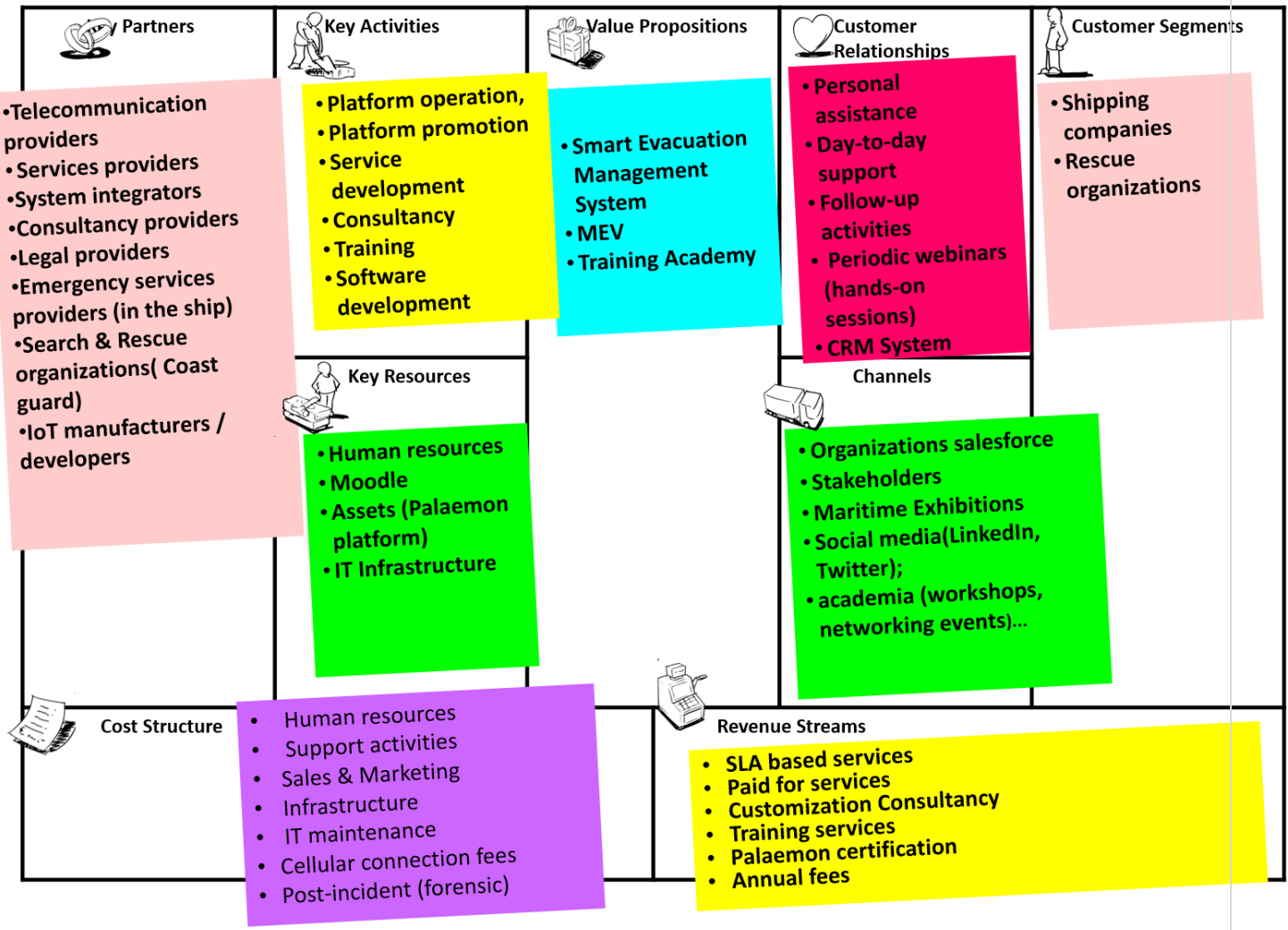

Figure 5 PALAEMON Business Canvas (Source: Strategyzer)

In the figure above, the PALAEMON Business Model canvas is shown and the information is placed in 9 building blocks. The Business Model canvas was filled in collaboration with the consortium members.

6.3 Value Map

The value proposition has been identified by type of product offered by PALAEMON using the Canvas Value proposition.

6.3.1 Smart Evacuation Management System Value Map

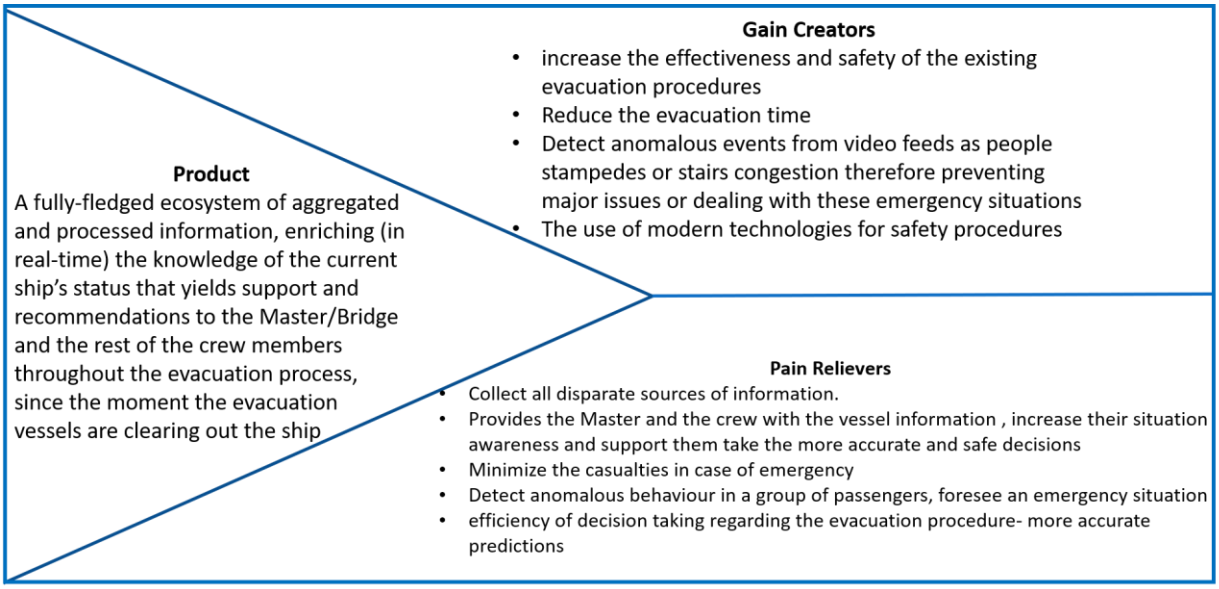

Figure 6 Smart Evacuation Management System (All technologies included) MEV (Source: Strategyzer)

6.3.2 MEV Value Map

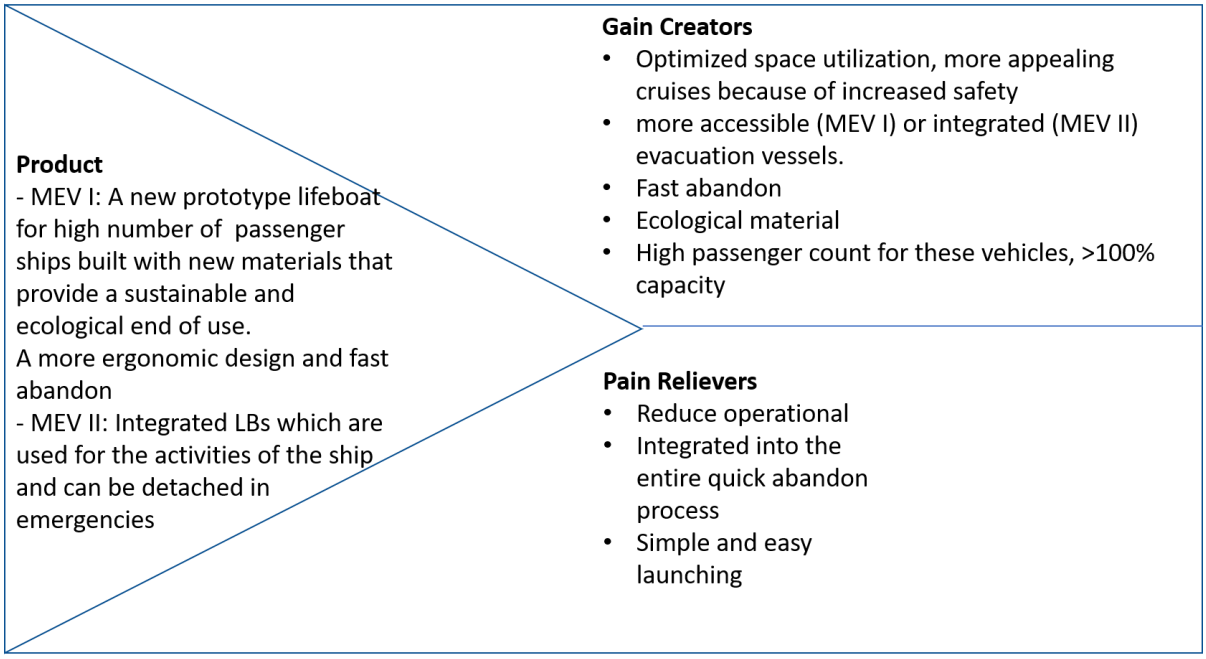

Figure 7 Value Proposition MEV (Source: Strategyzer)

6.3.3 Training Academy Value Map

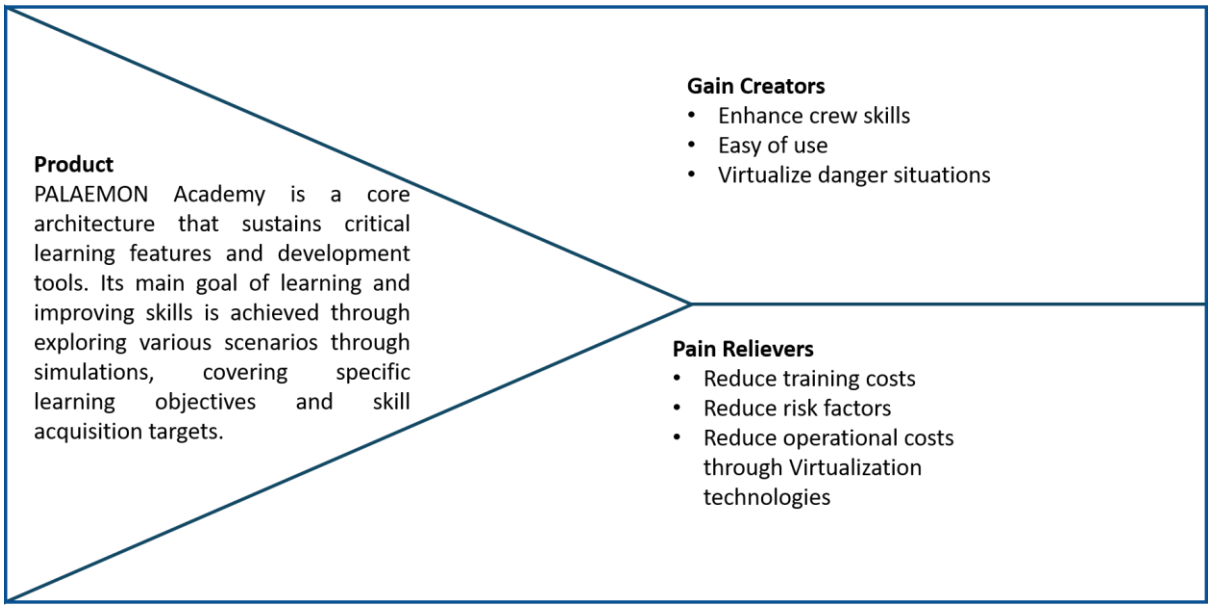

Figure 8 Value Proposition Training Academy (Source: Strategyzer)

7 Joint Exploitation Plan

7.1 PALAEMON Provider Ecosystem

PALAEMON ecosystem could be split into the following categories:

- Smart Objects Providers
- Network and ICT Infrastructure Providers
- Service Providers
- Naval Infrastructure Providers
- Evacuation ecosystem Providers
- Training Program Providers
- End users
- System Integrators
- Authority
- Academia

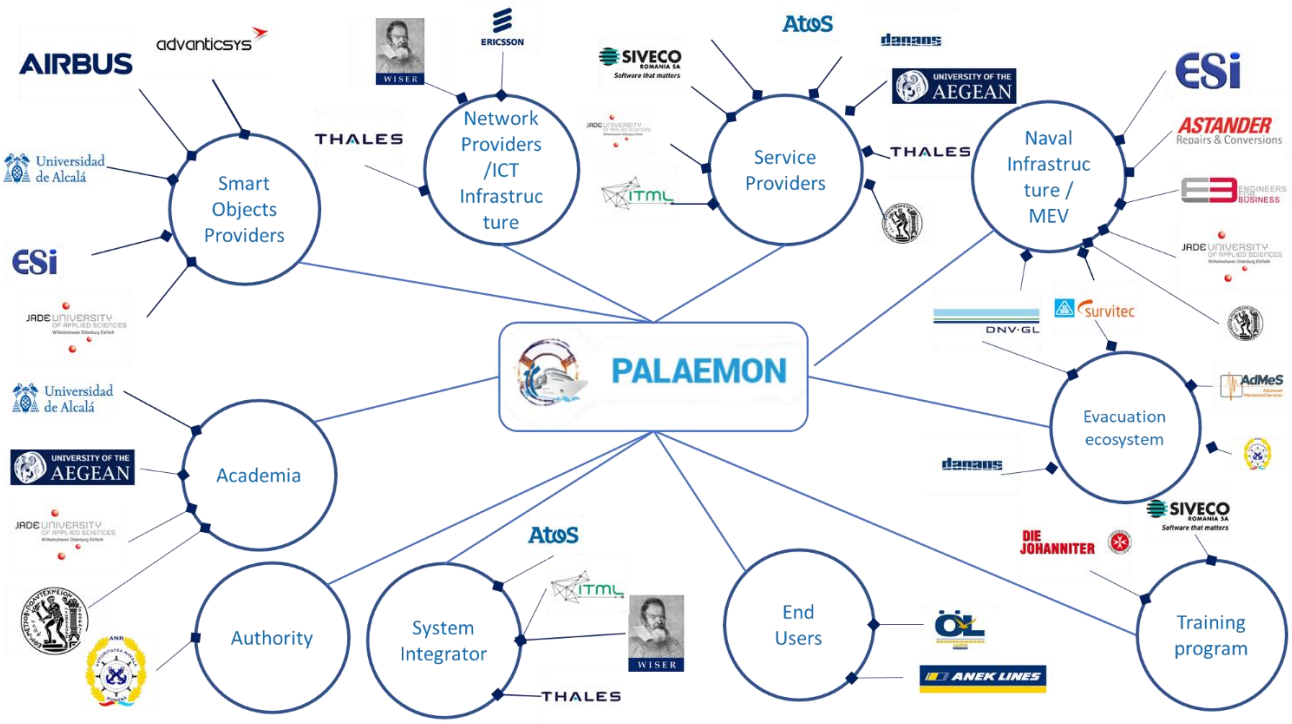

Figure 9 PALAEMON Provider Ecosystem

In order to achieve a successful implementation of the PALAEMON project, the participation of a wide range of stakeholders is needed.

Figure 9 PALAEMON Provider Ecosystem shows that the consortium covers a broad spectrum of type of providers. As it can be seen, different combinations among partners can be formed to deliver business value.

7.2 Exploitation opportunities

As it has been stated in the previous section 5 and categorized in section 7.1 , the PALAEMON consortium is highly heterogenous and the partners have expressed a plethora of exploitation alternatives , see Figure 10. These alternatives can be enumerated as follows.

Individual Exploitation: This option can be undertaken by an individual partner, when the result produced by the partner is independent of the other results and partner's result can be exploited independently. This option has been highlighted by some partner in its individual exploitation plan.

Bilateral Agreements: This option has been expressed by some of the organizations and will be undertaken when two or more organizations will reach independent agreements to commercialize their solutions developed during the PALAEMON Project. e.g.: "*WISER is an SME, so it is unlikely to face the maritime market by itself. For this reason, a joint venture with Thales Italia is the target strategy to be followed by WISER. Hence the customer identification will be carried out by Thales Italia"*

Exploitation Agreement:

In order to undertake joint exploitation opportunities, the Consortium is currently studying to agree on a joint exploitation agreement. Partners willing to continue the exploitation beyond the PALAEMON project life should agree in the terms and contents of the agreements.
This document usually contents the following sections:

- Definitions: in this section the definitions used in the agreement are detailed.
- Scope: Define the scope of the agreement.
- Duration: Establish when the agreement takes effect.
- Exploitation Committee: Detail the main entity which will be in charge of the exploitation of the Product(s).
- Results of the project: Describe the list of results that can be part of the solution.
- Commercial Setting for the Use of Assets owned by the other Parties: this section describes the model and price list, the roles and responsibilities and the revenue sharing program.
- The following sections are common in an exploitation agreement
    - Liability
    - Confidentiality
    - Termination
    - General Clauses
- Signatures: the list of parties involved in the agreement duly sign the document.

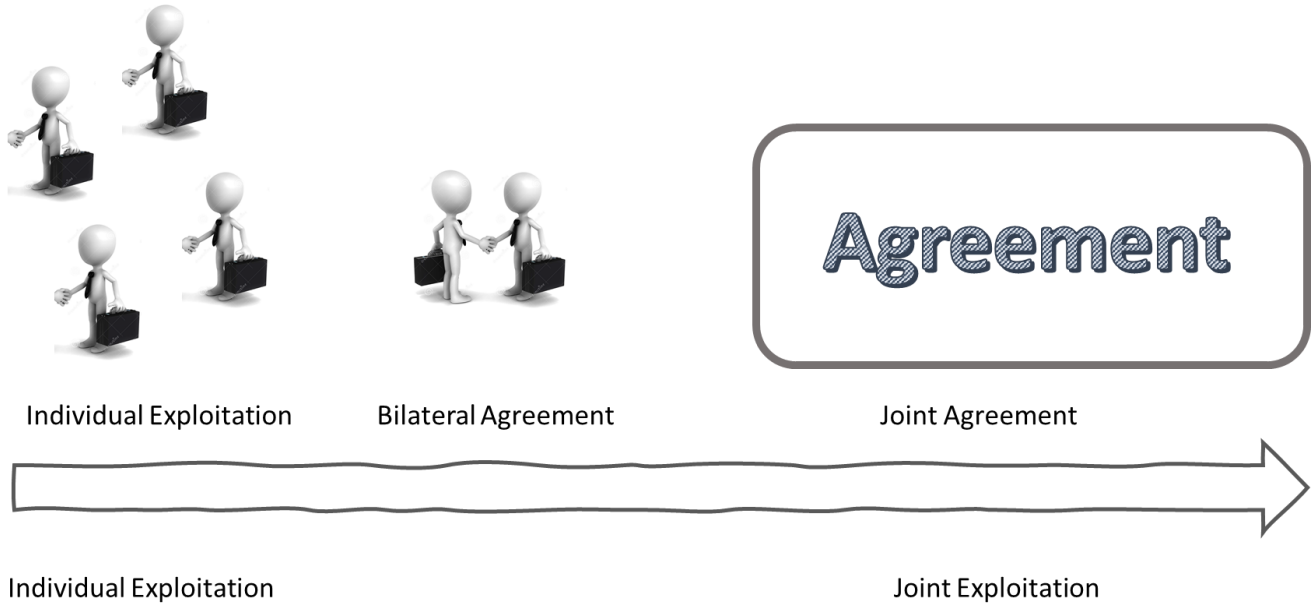

Figure 10 Different exploitation models

7.3 Monetization

7.3.1 Monetization of the Platform

PALAEMON project's monetization options are shown in this section:

SLA Based Services: According to Gartner's Glossary[5]: "A service-level agreement (SLA) sets the expectations between the service provider and the customer and describes the products or services to be delivered, the single point of contact for end-user problems, and the metrics by which the effectiveness of the process is monitored and approved." The SLA defines the services that should been provided as well as the service's duration and its price.

Paid for Services: In this case the customer pays a fix price per service.

Customization consultancy services: Consultancy services for adapting the platform to the customer's infrastructure and maintenance services are offered in this option.

Training services: In order to acquire an effective knowledge of the PALAEMON Platform and to train the users training services can be offered to the customers through the PALAEMON Academy.

Annual fees: A fix price is set by year for the use of the platform, usually in a monthly basis; an annual fee should have a discount.

7.3.2 Monetization of the MEV

The following revenue model has been identified by the partners to commercialize the MEV.

The common alternative is to sign a sales and manufacturing consortium agreement between the engineer organization who designs, approves the construction and detail plans of the MEV, the MEV manufacturer and the MEV integrator on the ship.

A co- joint offer is presented to the customer, setting the value of the work separately for each company.

8 Intellectual Property Rights

To guarantee the correct use and application of software licenses in PALAEMON, the consortium follows an IPR management procedure.

The procedure can be summarized as follows:

- Per each PALAEMON software component the following steps should be followed.:
  - All the components that are part of a component and its licenses are collected.
  - Study one per one the compatibility between the sub-components licenses.
  - Publish the component with a license compatible with the sub-components license.

See Figure 11below to see common licenses compatibility.

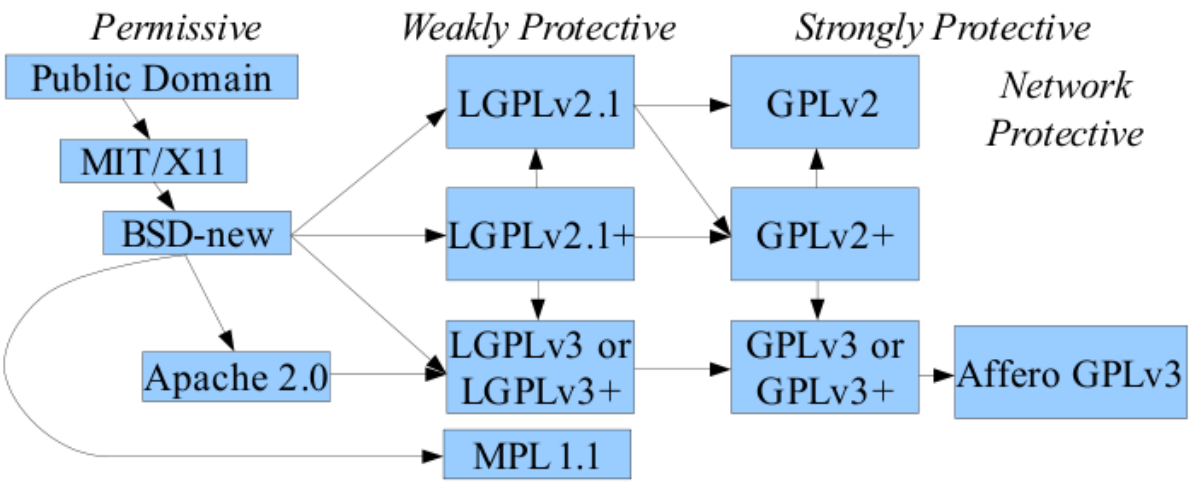

Figure 11 Licenses compatibility David A. Wheeler (2007)

In order to facilitate the accomplishment of the IPR Procedure, PALAEOMON source code is being placed in the GitLab[6] repository ,see Figure 12, where every software component should have the software license described.

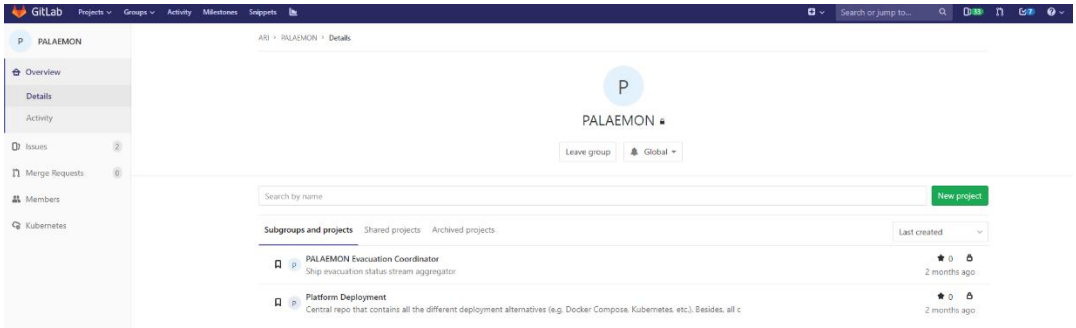

Figure 12 PALAEMON Gitlab

9 Conclusions

The main activities covered in this deliverable are:

- Identify the PALAEMON Results
- State the PALAEMON Unique Selling Point
- Collect the PALAEMON's partners exploitation plans.
- Study the Joint Exploitation and monetization options
- Provide the initial version of the PALAEMON Business model and value proposition
- Establish a procedure to Follow-up the Intellectual property rights

The PALAEMON results can be summarized into the following main blocks:

- Massive Evacuation Vessels (MEVs):

- MEV I: A new prototype lifeboat for high number of passenger ships built with new materials that provide a sustainable and ecological end of use. A more ergonomic design and fast abandon

- MEV II: Integrated LBs which are used for the activities of the ship and can be detached in emergencies

- Smart Evacuation Management System:

A fully-fledged ecosystem of aggregated and processed information, enriching (in real-time) the knowledge of the current ship's status that yields support and recommendations to the Master/Bridge and the rest of the crew members throughout the evacuation process, since the moment the evacuation vessels are clearing out the ship

- PALAEMON Academy:

PALAEMON Academy is a core architecture that sustains critical learning features and development tools. Its main goal of learning and improving skills is achieved through exploring various scenarios through simulations, covering specific learning objectives and skill acquisition targets.

Partners have stated their exploitation intentions in section 6 Individual Exploitation Plans. The plans have provided a detailed knowledge to succeed in the understanding of the exploitation opportunities. Taken together these plans a wide range of exploitation alternatives have emerged. Furthermore, these alternatives can be combined and will be taken into account as the foundations for the final joint exploitation.

IPR Management procedure is defined to guarantee a correct use of software licenses in the PALAEMON Project.

Further work

Once the findings of the current deliverable have been provided, the following activities have been planned for the next period with more focus on the following activities:

- Identify the final TRL reached by each exploitation result and the actions needs to commercialize the solutions
- Undertake the business cases in order to provide the economic analysis of the final solutions to evaluate the profitability of the revenue model, the cash flow and evaluate the needed actions to reach final stages.

- Monitor the identified business cases and identify new ones.
- Review and complete the current exploitation plans included in this deliverable.
- Define the joint exploitation plan based on the Exploitation Plans in this deliverable.
- Monitor the IPR of the results
- Investigate the current standards and the opportunities to collaborate to them through task T9.3 Assessment of equivalence of PALAEMON solutions with existing standards and potential barriers(M18-M36)

10 REFERENCES

[1] https://www.airbus.com/defence/security-solutions/Styris.html
[2] https://www.cert1.gr/)
[3] www.aegean.gr
[4] Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2014). *Value proposition design: How to create products and services customers want*. John Wiley & Sons.
[5] *Definition of Service-Level Agreement (SLA) - Gartner Information Technology Glossary*. Gartner. (2020). Retrieved 8 November 2020, from https://www.gartner.com/en/information-technology/glossary/sla-service-level-agreement.
[6] https://about.gitlab.com/