

# Developing an Effective Maritime Education and Training System- TUDEV Experiment

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## ABSTRACT

The purpose of maritime education and training (MET) is to supply manpower for the shipping industry. Furthermore, it aims to establish the fundamentals of the seafarer's discipline. MET covers a wide spectrum of training institutions which range from those delivering short-time courses to post-graduate studies. The ship, core element of the shipping, operates worldwide in a multinational, multicultural and multifunctional environment. To facilitate working in such a complicated environment, the seafarers must be trained taking into account the entire aforesaid environments, taking into consideration, all international standards and related regulations.

The commonly agreed principles in establishing an effective MET are based on some of the following considerations:

- Application of Internationally recognized standards including STCW
- Cooperation with accrediting, awarding and licensing authorities as well as MET institutions worldwide
- Meeting local requirements
- Close cooperation with shipping industry to meet their requirements
- Adopting new education and training technologies into MET
- Updating programmes to cover new requirements and technologies applied to shipping industry
- Providing continuous education for industrial updating
- Covering all stage of MET to achieve continuous education
- Balancing and matching academic studies and on board training taking into consideration licensing authorities.

In the last decade, Turkish shipping industry has shown a rapid improvement in the number and quality of her fleet which necessitated a requirement for improving the MET system in Turkey. To achieve this mission, with international cooperation and support from European Union projects, the Turkish Maritime Education Foundation (TUDEV) and the Turkish Chamber of Shipping (TCS) initiated a programme in 2003 based on unlimited watch officer training. The encouraging results led to further enhancing of MET by establishing the first Turkish Maritime University - "Piri Reis University".

Piri Reis University has been established to support the maritime industry, to cover all aspects of the MET, and offers a range of maritime study programmes - graduate to postgraduate levels.

**KEY WORDS: MET, Maritime Standards, Navigation Engineering Programmes, Nautical Science Programmes, Maritime Education and Training**

## 1. INTRODUCTION:

International Maritime Organization's (IMO) international convention on Standards of Training, Certification and Watch-keeping for seafarers (STCW-78/95) was ratified by all maritime nations. To date, most countries have been unable to attain the required standards. In this regard, the STCW's "Terms of Reference" do not permit the IMO to supervise maritime nations or to assess their compliance with the STCW requirements. However, IMO has accorded a high priority towards the application and implementation of STCW standards; and, in many of IMO's committees, IMO has advised/encouraged all contracting governments/interested parties to review and, as necessary, to revise their crew academic/vocational competency described in STCW. Furthermore, EMSA (European Maritime Safety Agency) started regular assessment process providing quality improvement in the MET institutions throughout EU members and candidate countries.

In recognition of the importance of establishing uniform training standards, ship and environmental safety at sea, some countries in collaboration with their maritime industry associations and maritime education and training institutions expressed their firm commitment to implement recognized standards that lead to uniform approaches in the control mechanisms of seafarer's education and training that include: monitoring, assessment, approval and accreditation.

Needless to say, the deck officer (Navigation Engineer) in TUDEV has a crucial interest in improving her/his knowledge and skills to avoid getting into dangerous predicaments that potentially lead to a maritime near-miss situation and/or an accident. Understandably, therefore, the quality of education and training plays a critical role in reducing maritime accidents and in promoting ship safety, environmental protection, and economical ship operation - at sea, restricted waters and/or in port areas. The knowledge and competency compel the "deck officers" to achieve the highest possible standards which can only be achieved in internationally recognized maritime education and training institutions.

A deck officer needs qualifications which emphasise not only technical but also management and business areas. In this regard, mission based training, assignments/projects and enhanced use of simulators has become an integral part of the vocational education and training.

**Communication difficulties** - lack of or insufficient English language skills - play an important role in the development and occurrence of near-miss or accident situations at sea. STCW has established English language standards for deck officers working in an international environment. However, incorporating specific English language education programme which is fully in compliance with the STCW standards for non-native English language speakers appears to be in need of a review and, if necessary, should be revised.

In today's challenging world, all professionals need to keep themselves updated. This requires all respective individuals to undertake additional academic and/or vocational studies, not only for those in Undergraduate programmes but also for those in Postgraduate and Doctorate programmes. Supplementary academic programs provide improvement in Nautical Sciences, as well as in other maritime disciplines that are closely related to the Nautical Science such as Port Administration, Port Management, Shipping Agency, Maritime Security, Freight-forwarding, Insurance, etc.

To achieve all of the foregoing and beyond, the deck officer needs to be a person possessing a

multitude of qualities that include but must not be limited to just a progressive vision, but also tenacity, perseverance, patience, diplomacy and, above all, hard-work. And, never forgetting and/or underestimating that seafaring is recognized as and remains a dangerous profession!

The Navigation Engineering/Nautical Science Programme should be designed to provide students with an in-depth knowledge and expertise in managing and operating a vessel to which they are assigned as competent Deck Officers with the ultimate goal of becoming a Master/Captain of a vessel. The emphasis throughout remains on the learning of nautical topics and systems and is complemented by appropriate practical training – on board ship and, for specific applications and/or scenarios, by the use of appropriate simulators. The knowledge acquired and aptitude strengthened/honed during the overall MET program enables the watch-keeping officer to safely navigating the ship.

Equally important is the fact that the Navigation Engineering graduates should, apart from having the capability and the ability to manage a vessel, be able to communicate effectively with vessels in the vicinity, approaching territorial waters with appropriate coastal governmental and non-governmental agencies (pilotage, vessel traffic centres, customs, health, shipping agents, etc.) and port authorities. At the same time, a graduate from a Nautical Diploma/Degree Programme is expected to and should have the capability and the ability to address a broad range of ancillary technical matters necessary for the management, maintenance and, safe and profitable operation of a shipping company's vessel or vessels. Besides, the Diploma/Degree Program should be designed to provide a broad range of knowledge and skills in the area of Information Technology – a tool necessary today in the management and working of any shipping company/maritime industry.

In essence, it is vital that the coverage of the designed programmes delivered by MET institutions should be with the principal aim of preparing the graduates not only to augment their initially acquired knowledge and skills in a class-room setting but also to encompass a practical hands-on vessel operation and overall shipping company management operations.

## **2. THE PROGRAMME – DESIGN PHILOSOPHY:**

In summary, the principal aims of the programs delivered by TUDEV (Piri Reis University) are the following.

### **2.1. Application of Internationally recognized standards:**

To standardise MET in TUDEV, guidance was sought from IMO Model courses and, later from the STCW-78/95 which also appeared at the time to be in need of an extensive review. As a consequence, TUDEV decided to revise its both Deck and Marine Engineering program by following the Business and Technological Education Council (**BTEC**) Higher National Diploma (**HND**) programme of the U.K.

Sea-training standards were accordingly adjusted to comply with the U.K. BTEC requirements, which fulfil National Vocational Qualification (**NVQ**) and Scottish Vocational Qualification (**SVQ**) sea training requirements including the amendments made to the STCW in 2003.

The TUDEV Deck (Navigation Engineering) programme as such includes a “Two Phase” approach, which has sea-training in each Phase. The First Phase addresses “core units” and the Second Phase - “advanced studies” with opportunities for progression onto higher qualifications including post-graduate and doctorate degrees.

The units in the “First Phase” are designed to introduce and address the main aspects of Navigation including mathematics units which provide a foundation for engineering education. As a beneficial consequence, they also assist in addressing units related to “Ship Construction, Ship Stability, Cargo Handling and, Navigation”. The knowledge and skills acquired in this phase are sufficient for the start of the “Phase-I Sea Training”.

In keeping with the requirements of the STCW-78/95 (2003), the focus of the “Second Phase: is on Deck and Engineering Officer Competency. This phase is based on the fundamental courses that require a deck or engineering officer to undertake Watch-keeping duties and, also cover Phase-II of Sea Training.

The “Second Phase” systematically progresses to fulfil the requirements necessary for taking-on higher level complex responsibilities both in Navigation and Marine Engineering shipboard activities. Advanced Maritime Studies such as Maritime Economics, Port Operations, Safety Management, Risk Management, and Logistics Management, for future professional progression and academic development are included in the Undergraduate and Postgraduate studies

## **2.2. Cooperation with International MET institutions:**

Exchange of information and know-how is the main element of system development. The close cooperation and coordination with national and international counterparts enhances and provides mutual benefits for all concerned parties.

European Union projects have become an essential tool in providing for a catalyst and the cohesiveness of efforts that focus towards a common goal, providing mutual benefits to all participants. Research projects support academic studies and Leonardo Projects support vocational studies; the two play a significant role in improving new methodologies, procedures and techniques.

A project like Safety-on-Sea (**SOS**) instigated and led by TUDEV, with the participation of different maritime education institutions, is a major study project in improving Maritime Education System in Europe. The ongoing Maritime English Language (**MarTEL**) project has established to develop a measurement systems for the testing/examining of seafarers of their “Maritime English” standard and competency. TRAIN 4C (Train for Sea) is an EU Leonardo Mobility project which enables transfer of cadets to other MET institutions. Eleven TUDEV cadets were supported through this project and went to GCNS/Scotland for their Post-HND training and MCA oral exam preparations.

International cooperation enables us to get benefits from the experiences of other colleagues and institutions which are key elements in improving the current standards in maritime education and training.

TUDEV enjoys cooperation with and recognition from several Universities and MET institutions, accrediting and licensing authorities in the U.K., and in other European Union countries through European Union projects designed to improve the quality and standards of maritime education and training. Some of the institutions collaborating with TUDEV are: England - Northumbria University, South Tyneside College, De Montfort University, Plymouth University; Scotland – Strathclyde, Glasgow University and Glasgow College of Nautical Studies; Norway – Trömsö University; and several others in Poland, Finland, Slovenia, etc.

The TUDEV programmes receive external verification from BTEC, NVQ and SVQ, Excellent Education (**EDEXCEL**), and IMarEST.

### **2.3. Meeting local requirements:**

The Under Secretariat of Maritime Affairs (**UMA**) is the responsible authority for maritime education and training in Turkey. MET programs are delivered in compliance with the IMO requirements, and adhere to the maritime regulations promulgated by UMA and education rules of the National Education Ministry (**NEM**).

TUDEV Programmes comprise one (1) year of preparatory English Language classes and two and one-half (2.5) years of vocational training. In addition to which, the Deck cadets require to complete one-year and, the Engineering cadets six months of sea training.

Subsequent to graduation from TUDEV, the cadets are able to write for their Officer of Watch Certificate of Competency as well as for their HND. Furthermore, the graduates can if they wish to enrol on the final year of an appropriate the B.Sc. (Hons) degree programme. They can also write the Maritime and Coastguard Agency (**MCA**) and set for their examination for a certificate of competency (CoC).

The Maritime Training Evaluation Committee (**MTEC**) is the responsible authority of UMA and inspects all MET institutions in Turkey. And, MET standards are monitored and audited by both UMA and NEM. In this regard, TUDEV has the highest approval rating from UMA for its MET program.

Finally, the Higher Educational Council has the process underway for the transition of **TUDEV** to **Piri Reis University**, as well in the engagement of higher level academic lecturing staff for the University. New programs in the Piri Reis University, in response to the needs of the maritime industry, are expected to include post graduate studies to the Ph.D. Level.

### **2.4. Close cooperation with shipping industry to meet their requirements:**

TUDEV, in fact, is a Foundation (Charitable Trust) established by the Turkish Chamber of Shipping to fulfil the requirements of the maritime industry.

The primary aim, therefore, for MET in TUDEV is to equip the graduates with a full-fledged knowledge and understanding for the application of the latest available technology – hardware and software. Ongoing research in the subjects currently covered and/or those that will be

offered during the transitional period (TUDEV to Piri Reis) will be of a design that will benefit the maritime industry viz. management, operations and developments related to ships and ports, viz. navigation and propulsion (clean diesel - MARPOL), ship/port interface – safety and security, naval architecture - shipyards (cost estimations for updating existing and new buildings), maritime logistics and, maritime services providers, etc.

TUDEV - PRU is located amidst an environment of major shipbuilding industry and, consequently benefits immensely in its delivery of practical training to its graduates. At the same time, because of the Institution's ideal location, enjoys close cooperation with the shipping companies for the requisite sea training necessary for its graduates.

## **2.5. Adopting new education and training technologies into MET**

The new posture of the world merchant fleet introduces highly improved ship-board automated systems. The education system in TUDEV, therefore, prepares the cadets of the day and those of the future to effectively optimise the safe usage, care and maintenance of advanced ship-board automated systems.

The shipping traffic is rapidly increasing. The size and speed of the ships are proportionately on the increase. To provide safety in the designated/chartered routeing schemes, there is a need to research creative training methods and procedures that will provide calculated and tried out rapid responses in emergency situations. The use of full mission based simulator training in TUDEV for its MET programmes have proven useful and gainfully provided the students with a learning advantage when unpredictable dangerous conditions encountered at sea have been demonstrated to them in real-time simulations. Logical conclusion of which is: wide use of simulators in MET deemed a necessity and an important requirement in MET institutions for the foreseeable future.

In keeping with the requirements of IMO - STCW and, "Vocational Standards" applied by maritime nations for higher qualifications, TUDEV employs "Quality Management" processes and procedures. Quality Standards developed by International Professional Institutions are included for both the students and "Staff". The Academic Staff also complete a series of staff development initiatives, including the application of internationally recognized Assessment and Verification Certification Programmes.

MET programmes in TUDEV endeavours to assist the students in fully realizing their potential in their chosen career by adding value to their knowledge and acquired skills and, to their overall understanding of the profession. In this regard, the drive is to motivate the cadets to "Self-identify" their interests for maximum achievement – a vision through joint partnership – student and lecturer. The aim of TUDEV is to promote in cadets the process of active critical thinking – reading and examining a problem, analysing the problem, identifying and classifying information, reasoning intelligently and so forth.

Finally, amongst other learning objectives, the students are given the opportunity to develop planning and organisation skills, as well to develop an understanding of the issues involved in the management of change, in a scientific and technological environment. In addition to which they are guided into gaining group learning experience through group case studies and individual case study assignment presentations.

## **2.6. Updating programmes to cover new technologies applied in shipping industry**

The study of “Project/Project Management” is considered necessary in graduate studies. The modern management systems and practices are based on the principles of “a learning organisation”, the design of which is to provide an effective and efficient system of managing the intended learning audience and/or the teaching staff. The focus must be in providing a meaningful learning experience which ensures that the learning audience remains involved in whatever is decided and/or from the results/guidance emanating from such presentations.

The goal must be, as far as is possible to do so, to accurately identify strategies for achieving organisational goals. In doing so, we must establish an effective and efficient management system - a linear operational structure that is action orientated. Such a management system must provide the necessary information about the organisation, its people, committees, quality principles and procedures, including the methods for collecting and speedily acting on information.

The overall updated programs must include units that support engineering skills - marine systems and data systems, as well in the study related to modern digital circuits and their use in computer systems.

The objective of TUDEV, in the delivery of its MET programmes, is to ensure a learning environment where students and staff are partners in the learning and teaching processes respectively.

The Lecturers in the Institute are encouraged to keep themselves current with respect to new technologies related to and applied in the shipping industry today. And, in the delivery of their class-room presentations, to reference innovative studies and relevant teaching material considered necessary for the Unit.

## **2.7. Covering all stage of MET to achieve continuous and unified education of benefit to the maritime industry – learning institutions and industry**

To explain and clarify in broader terms the status of TUDEV under the BTEC Programme is to the effect that, BTEC/HND only satisfies the underpinning knowledge of Merchant Navy Cadet Officers (both deck and engineering watch keeping officers). Therefore, BTEC/HND Programme together with NVQ/SVQ (MNTB - Merchant Navy Training Board portfolios) satisfies all of the IMO/STCW requirements. As part of SVQ/NVQ System, it is subject to Scottish (SVQ) and English (NVQ) Government Inspections at the highest level.

Besides, BTEC/HND is complemented by additional units which satisfy STCW and IMO requirements for seafarer’s certification - deck and engineer watch-keeping officers.

Training programme is fully approved by BTEC and, TUDEV is an authorised BTEC CENTER to issue BTEC/HND diplomas. TUDEV programmes are subject to monitoring and inspection by BTEC as well by SVQ/NVQ verifiers.

Furthermore, TUDEV graduates are entitled to a BTEC HND and, satisfy the requirements for membership in the Institute of Marine Engineering, Science and Technology (**IMarEST**) - a professional body with the power to award professional qualifications recognised

internationally worldwide under the Washington Accord Treaty. As well, the teaching staffs of TÜDEV are members of IMarEST.

In addition to BTEC/HND programmes which satisfy IMO/STCW requirements, TUDEV also provides additional courses viz., Efficient Deck Hand (**EDH**) an MCA requirement,

Emergency Response Procedures and Basic Communications in coordination with Bridge-Team Management (**BTM**), Ship-Handling Procedures, Naval Communication and GMDSS Courses, Electronic Navigation which includes Gyro Compass and Coning, Automated Pilot, Electronic Charting Display Information System (**ECDIS**), Integrated Bridge System (**IBS**) Automated Identification System (**AIS**), Radar and Automatic Radar Plotting Aid (**ARPA**) systems, and Engineering simulator courses. In respect of the various practical courses conducted and offered by the Institute, the shipping industry remains an active client of TUDEV.

Finally, as part of the scientific research and development studies conducted at TÜDEV, the Institute has published international papers, reports and major projects in respect of the deficiencies of the STCW and IMO Education and Training Programme. Therefore, we at TÜDEV are not only a training and education centre but, also an institution performing research studies which assist and are of benefit to the maritime industry. The mission and the primary objective of TÜDEV remains, one of a MET learning institution of excellence providing high quality MET programmes and continuous education and training to industry.

## **2.8. Balancing and matching academic studies and on board training**

Recruitment of seagoing officers has traditionally been a difficult task, despite the shortage of seafarers worldwide. Paradoxically, this may not be the case today because of the down-turn in world economies. Besides, where the numbers are available, the quality of individuals wishing to enter into the profession is poor.

Shipping today is highly specialised, competition for the right candidate for the right ship is intense. Higher levels of skill are needed for specialty vessels of today. International rules require skilled watch-keeping personnel to man ships.

New and ongoing developments in the shipping industry, year-to-year place increased compliance requirements on MET institutions and in turn additional demands on the students who must carryout their applications in practical settings. The course curricula is appropriately updated and covered in classroom sessions notably, amongst a host of others, the “International Safety Management Code (**ISM**)”, the “International Ship and Port facility Security Code (**ISPS**)”, the “Maritime Prevention of Pollution from Ships (**MARPOL-73/78**)”, etc. Other demands placed on ships’ watch-keeping officers are those stemming from various inspection regimes notably, the “Port State Control (**PSC**)” inspections.

As stated earlier, TUDEV follows the structure/contents of BTEC/HND programmes. The duration in the Institution are utilised to develop the skills, knowledge and understanding required for statutory certificates of competency and assessment of NVQ/SVQ. The courses in Navigation Engineering lead to award of an HND in Nautical Science and, in some cases, are part of an undergraduate scheme leading to a first degree. Cadets obtaining these qualifications, and qualify NVQ/SVQ Level-3 are given exemption from the MCA written examination for officer of the watch certificates of competency and, as well may qualify for

further exemptions for higher grades of certificates of competency.

The periods of sea-going training are of paramount importance in the development of the skills, knowledge and experience necessary by officers today for the safe and secure operation of ships they will sail on as junior officers and ultimately as masters. The sea service must be planned and must include evidence of satisfactory completion of such training as required for the first certificates of competency as “officer of the watch (**OOW**)” in accordance with the STCW Convention.

As well, the requirement for the fulfilment of requisite bridge watch-keeping duties and testimonials with respect to character, standards of behaviour including sobriety, experience and ability on board ship are essential documentations for application for a certificate of competency. All of which must be signed by the Master of the ship on which the candidate has served.

In addition to the above, in compliance with the requirements of the European Union, the thrust of TUDEV is to ensure that the academic and vocational programmes are in keeping with on-the-job training. In this regard, the undergraduate programme which covers three years of classroom studies is supplemented with one year of on-the-job training.

### **3. CONCLUSION:**

TUDEV maritime training programmes were developed with support from the EU and in cooperation with national and international maritime regulatory authorities and, as well with domestic/international maritime education institutes and maritime industry organizations. At the same time, the programmes are screened and approved by respective maritime training institutes and governmental maritime authorities worldwide.

Despite the foregoing statement, there are several important issues that need to be resolved for the successful and up-to-date delivery of MET programmes. One of the important requirements, inter alia, is that of the English Language which poses for some non-English speaking maritime nations a daunting task. English is the Maritime Language and understandably crucial in the avoidance of near-miss or accident situations at sea. TUDEV, in this regard, played and is playing an important role in the development of Maritime English Standards by its active participation in the development and writing of the MarTEL project.

**TUDEV has included in its program a total of additional 8 hours per week of English Language teaching – 3 hours of Maritime English on maritime subjects and 3 hours of conversational English delivered/taught by certified Masters and Chief Engineers, and 2 hrs of the same by qualified native English language lecturers. TUDEV is expected to adopt MarTEL Study Units and Tests and seeks recognition for them.**

Academic studies, which form the base in the delivery of vocational subjects, are delivered in close cooperation with the maritime industry. The needs and desires of the maritime industry are taken into consideration and the Units are covered in a manner which will successfully respond to the requirements of the maritime profession – ships and ports. TUDEV is cognizant of this crucial aspect in the delivery of its MET programmes, and remains of the opinion that cooperation between seagoing officers and maritime industry is essential if it is to happily keep the marriage between the two viable, progressive and prosperous. Without

progressive competent seagoing officers, the maritime industry of any country will face indomitable difficulties. MET Institutions must develop and maintain close cooperation with the Maritime Industry, the ultimate recruiters for the fulfilment/supply of competent Masters and Watch-keeping officers.

It is envisioned that STCW, in 2010, will be revised in response to the many changes in technology – navigation and engineering - already underway. TÜDEV, in this regard, has in its strategic planning the changes anticipated at this time that are likely to have a profound effect on the successful and profitable ongoing management, developments and operations affecting all sectors of future maritime industries.

TUDEV has developed new projects such as SURPASS (concerning Automation) and SOS II (regarding Emergency Situations) with support from several major MET institutions in the EU.

TUDEV programmes are designed and developed with regard of the EU through Leonardo SOS Project, MarTEL Project (as well as e-GMDSS and TRAIN 4C projects) have now been fully tested. Some 11 students were sent to GCNS on a Post-HND programme and five of these students received MCA's Notice of Eligibility. 3 students were enrolled on final year of Plymouth University BSc (Hons) in Nautical Science (Merchant Shipping). All students were successful and received their BSc (Hons). **As far as the MarTEL projects concern, MarTEL (Maritime English) tests have been piloted in Turkey, UK, Poland and Finland.**

Finally, **TUDEV - Piri Reis University** can proudly state that it enjoys high accolades and recognition from sister maritime industry/organizations and MET institutions, considering its affiliations with a host of MET institutions worldwide.

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Captain Demirel graduated from Naval Academy in 1971 and joined Turkish Navy. After completion of the Naval War Collage education in 1980 he commanded destroyers, served in the Coast Guard Headquarters as Assistant Chief of Staff Operations and Surface Training Centre as Chief of Education.

He commanded the Turkish Fleet Logistic Division and Midshipmen Regiment of Naval Academy, he served as Academic Dean of Naval war Collage.

After retirement in 2001, he becomes Board Member of OMSAN Logistic Turkey which is one of the biggest logistic companies in Turkey. He has given Maritime Strategy lectures in Istanbul University and Naval War Collage.

He joined TUDEV in 2003. Capt Demirel is the Programme Leader for Navigation Engineering since 2005.

### **CAPTAIN ROMESH MEHTA**

Capt. Mehta graduated from the Indian Mercantile Marine Training Ship “IMMTS Dufferin”, Mumbai (Bombay), India in 1958 and served his sea-time on commercial cargo vessels to the rank of Chief Officer.

In 1966, he obtained his Master Mariner Certificate of Competency, and joined the Canadian Coast Guard (CCG) as Master aboard different types of specialty vessels, and undertaking winter Ice-Pilotage duties on the St. Lawrence River.

In 1974, he was offered the position of “Senior Nautical Surveyor” with Transport Canada (TC) – Ship Safety Directorate, fulfilling safety and security inspections and examinations, as well as lecturing assignments - national and international.

In 1981, he joined the TC-Harbours and Ports Directorate as “Chief, Operations Advisor”, fulfilling the advisory role - national and international regarding ship/port interface safety and security operational requirements.

Since 1998, independently on contracts, he has completed several overseas maritime consultancy assignments - Far East, Europe, India, Canada and Turkey. Currently, he is a senior lecturer at C4FF seconded to TUDEV as a senior visiting lecturer supporting EU SOS and MarTEL project.