



December Progress Report 2018

The EU Erasmus funded MariEMS and ACTS Plus papers were presented at the IMLA Conference in Manila, Philippines on 24-25 October 2018. It was noted that the IMLA Annual General Meeting (AGM) was held on 24 October 2018 during the [25th IMLA Conference](#).

The General Meeting provides an opportunity for members to review the achievements of IMLA in the past year and will open the floor for discussion on the future development of the Association. As a member of IMLA, we were invited to join this meeting.

Should you have any questions please feel free to contact me or our Honorary Secretary Prof. Clive Cole (email: clive.cole@wmu.se).

IMechE Midlands Dinner

Professor Ziarati was given the opportunity to present two prizes and Certificates; one on behalf of IMechE in view of the contribution by Professor Bob Shanks to Imagineering and one on behalf of IMarEST in the memory of Mr John Langley for his contribution to the industry and the Branch to Mr Trevor Lord to be given to two young people to learn about motorcycles and riding them. The first prize was awarded by Professor Shanks and the second prize by Dr Colin Brown, the CEO of Institution of Mechanical Engineers.

Two more prizes were announced by Professor Ziarati, one to be awarded by IMechE and one by IMarEST to two young Engineers. Respective committees will decide to whom to award these awards. The C4FF awards are each for £250 and complemented by a Certificate.

The following photos show a glimpse of well attended Dinner event, a photo from right to left of Mr Trevor Lord, CEO of 90-One with Dr Colin Brown, the CEO of IMechE, the President of the IMechE, Mr Tony Roche, as well as Professor Bob Shanks, the Chairman of Imagineering.

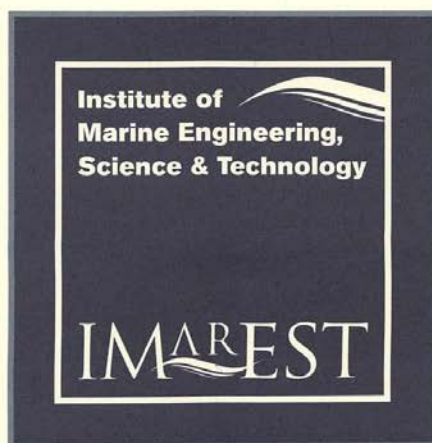




From right to left of Mr Trevor Lord, CEO of 90-One with Dr Colin Brown, the CEO of IMechE, the President of the IMechE, Mr Tony Roche, as well as Professor Bob Shanks, the Chairman of Imagineering.

MariEMS Recognition by IMarEST

The following is the letter and certificate awarded to MariEMS course as a recognised CPD Course by the IMarEST.



CPD Recognition Certificate

Marine Energy Management Systems

Provided by – **BAU United Kingdom**

The above course has been awarded official recognition as contributing to the Continuing Professional Development requirements of the Institute's members for a period of three years from 1st September 2018 to 31st August 2021.

President

Chief Executive

Dated this 3rd day of October 2018

The Institute of Marine Engineering, Science and Technology, Founded 1889
Incorporated by Royal Charter 1933





3rd October 2018

Prof Reza Ziarati
Centre for Factories of the Future
6 The Square
Kenilworth
Warwickshire
CV8 1EB



To whom it may concern,

Marine Energy Management Systems

The above course provided by BAU United Kingdom

I can confirm that the members of the IMarEST Professional Affairs and Education Committee (PAEC) were most impressed by the above-mentioned course and have recognised the course as contributing to an individual member's professional development requirements.

Please also be aware that the CPD Approval of Courses Working Group retains the right to remove the IMarEST 'recognition' of courses if not entirely satisfied with any aspect of the course content, provision or quality assurance.

Course providers are required to resubmit details of courses recognised by the IMarEST every three years, effective from the date of this letter. If the course content, provision or quality assurance of IMarEST recognised courses change at any time then course providers are required to resubmit the relevant details to the Working Group as soon as possible.

Please do not hesitate to contact me directly should you wish to discuss any of the issues raised in this letter, and please find enclosed your certificate.

Yours sincerely,

Tom Fanthorpe
Deputy Registrar



Visit to Warwick University and Warwick College Group

A visit was arranged to Warwick University WMG International Manufacturing Centre and to Warwick College Group with a view to initiated and following on previous visits the areas for joint collaboration with C4FF's BAU UK. BAU UK is a new university in the UK and is building on C4FF's previous joint degree and diploma programmes including MPhils/PhDs with its university and college partners. It is currently developing a degree in Computer Engineering and two Master programmes, for more information please see www.bahcesehir.as.uk.



Students Design & Building a Racing Car - Visit to WU from left to right Professor Reza Ziarati, Mr Coskun Ince & David Cooper



Manufacturing Autonomous Vehicles - From left to right Professor Bob Shanks, Mr Coskun Ince, Professor Flower, Prof Basak Akdemir & David Cooper

A new EU funded project

MariFuture has been informed that Erasmus + Mentor proposal has been approved by the EU. The kick-off meeting is scheduled for 3-4 December 2018 in Athens. More and detailed information will be provided about this exciting development in the November 2018 News

SIG (Special Interest Group) on Particulate Matter Filtration Flows in Automotive and Marine Applications

C4FF, the parent company of MariFuture, is now an official member of SIG (Special Interest Group) on Particulate Matter Filtration Flows in Automotive and Marine Applications which is run by UK Fluids Network. The group's activities involve, but are not limited to:

- organising 2 meetings a year
- development of resources for UK Fluids Network and wider community (knowledge base, guides to PM regulations, resources on modelling filtration flows, UK research facility and capacity database, instructional videos, tutorials)
- creating a collaboration networks and engaging both academic and industry in particulate matter flow research
- defining targets and building consortia for funding bids.

For more details of SIG, please click [here](#).



The SIG met on 20th September, 2018 at Newcastle University. Professor Reza Ziarati, founder of MariFuture, gave a speech at the event. The title of the lecture was "Recent Developments in Ship Energy Efficiency - Design & Operations". The full programme is as shown below. The next meeting of SIG is in Birmingham. Details of event will be published in the near future.

UK Fluids Network Special Interest Group on Particulate Matter Filtration Flows in Automotive and Marine Applications

Particulate Matter Flows: marine applications September 20th, 2018 Newcastle University

Programme

9:30 - 10:00 Registration and coffee

10:00 - 10:30 Dr Edmund Hughes (Head of Air Pollution and Energy Efficiency, Marine Environment Division of International Maritime Organization) "International Regulations for Reduction of Emissions from Ships"

10:00 - 11:00 Dr Armin Aulinger (Helmholtz-Zentrum Geesthacht, Centre for Material and of Coastal Research)

"Impact on the environment due to air emissions from ships"

11:00 - 11:15 Coffee break

11:15 - 11:45 Mr John Buckingham (BMT)

"Two stroke emissions: the complexity of defining the PM content"

11:45 - 12:15 Prof Reza Ziarati (Centre for Factories of the Future)

"Recent Developments in Ship Energy Efficiency - Design & Operations"

12:15 - 12:45 Prof Vincenzo Esposito (DTU)

"Nanofibrous materials for innovative compact flexible de-NOx SCR filters"

12:45 - 14:00 Lunch and networking

14:00 - 16:30 Tour of Newcastle University facilities at Blyth (Cavitation Tunnel and Research Vessel)

16:30 End of meeting, Coffee

Contacts

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UniBus

The latest meeting of UniBus took place at C4FF, Kenilworth, UK, on 1-2 November 2018.



UniBus Project Partner meeting in Kenilworth



UniBus Project Partner meeting at C4FF, Kenilworth

The project is progressing well. The project started in September 2017 and had its first partner meeting in Istanbul, Turkey in November 2017. The second meeting of the project took place on 26-27 April in London. The project intends to improve the quality and relevance of higher education through the creation of opportunities for the academia and business to come together, particularly regionally. The HEIs and VET providers should be centres of excellence in what they teach and to do this they must develop all staff and prepare their students for the world of work. They must work with and support businesses, for which they are preparing the young people as future employees and customers of the businesses' products and services. It has to be understood, that the interests which business has in wishing to establish or improve links with academia are different from those of the academia, and may not always be compatible. The educationalists can aspire to be altruistic; business people can only afford to be altruistic when they have made more than enough money for the maintenance and development of their businesses. This is not a moral judgement – it is a pragmatic one. Academia needs the industry to support it in the development of its programmes so that they can identify and respond to the needs of industry and commerce. It needs industry to seek funds to progressively develop its laboratories, and it needs industry to develop its staff members. Industry needs academia to improve the quality of its employees, present and future; it needs academia for technological progress useful to business, and to better the management of its business; it needs academia for the formation of its future customers, and so of demands for its products and services (Ziarati, 2016).



With regard to the horizontal priorities, the project's aim is to promote open and innovative education, mainly for adult and young people, embedded in the digital era in the cloud environment. The intention is to develop basic and transversal skills, such as entrepreneurship and digital skills, so that students could support industry in the challenges it is facing. It is important for them to understand what is already being done well and should therefore be further developed or supported, and what is not done well enough, or badly, and therefore needs to be changed, stopped, or replaced by something new. The intent of the project is also to create new things. A depository of student projects and industry's suggestions for projects could help both, the industry and academia, as this is one area which they can build their future collaborations. The project is expected to be concluded in August 2020.

ACTS Plus

The penultimate meeting of this EU funded project took place in Ljubljana, Slovenia on 14-16 September 2018. The final meeting is expected in March 2019 in Southampton, UK.

The first partner meeting for this approved project took place on 17-19 November 2016 in Istanbul. The second meeting took place on 30-31 March 2017 in Croatia. The third meeting took place in Varna, Bulgaria on 11-12 October 2017 at the same time as the IAMU conference. The fourth meeting of the partners was held on 18-19 April 2018 in Mallorca, Spain. The consecutive meeting was held on 13-14 September 2018 in Slovenia. Arrangements for the project Final Conference are being discussed with industry leaders. The conference is scheduled for March 2019.



ACTS+ Partner meeting in Slovenia - from left to right, Dr Anna (Croatia), Capt. Djani (Croatia), Tomaz (Slovenia), Capt. Guy (UK), Professor Reza (UK), Capt. Erol and Silja (representing Spain), Capt. Nikolai (Bulgaria).

The ACTS Plus paper prepared by Professor Ziarati and partners was presented at IAMU by Professor Ziarati, Capt. Mohavic (UoR) and Capt. King (SSU) after the keynote speech by the Rector of NVNA. As stated earlier a new paper is being prepared by the ACTS Plus Partners. The abstract drafted by C4FF and Spinaker with support from several partners was submitted and accepted by the editorial committee of IMLA. Croatian Partner, UoR, have agreed to produce the core of a scenario for the paper in the next few weeks. The paper would then be finalised with support from all nominated authors/partners. This second paper is expected to be presented at the next IMLA Conference in Philippines in October 2018.

The ACTS Plus project, ACTS Plus is based on the Pareto analysis carried out as a part of the recently concluded ACTs project. The Pareto analysis showed that some of the COLREGs rules are more complicated than others and that there are situations where a number of rules apply. The paper argues the importance of continuing the ACTs project both according to the plans for its post-funding period and also by preparing a new proposal for EU funding (ACTS Plus). It is worth pointing out that as a result of the new paper a proposal was prepared by some of the partners and submitted to the UK national agency.



This ACTS Plus project is led by Southampton Solent University (SSU) and coordinated by C4FF. The project started officially on 1st October 2016 and is expected to be concluded until March 2019.

University Centre Garden City

As reported in the July News the Centre Garden City was launched in June 2018. We would like to take this opportunity to, once again, congratulate all who supported the creation of the Bahcesehir University UK www.bahecesehir.ac.uk. Several new programmes are being developed and will be introduced in the next few months. The University will operate under the University Centre Garden City underpinned by all the group's academic and industrial units. Special thanks to the management and staff members of the Centre for Factories of the Future (C4FF) and MarEdu Partnership (MarEdu). Seeking approval from the UK Government to be allowed to use the title of the 'University' and registering the University with Companies House together with obtaining the 'ac.uk', all required a concentrated effort by the C4FF project team. The new University will be based in the UK. C4FF and MarEdu are both registered UK legal entities (one a limited company and the other a partnership) with many years of designing and running joint degrees including MPhil/PhDs. The respective websites can be found at www.c4ff.co.uk & www.maredu.co.uk. The University will operate through its academic partners and at its newly established business centre, Berkeley House, in Kenilworth, the heart of England, during its initial development phases. Its first Foundation Degree will be offered through the Warwickshire College Group and the Degree top-up through De Montfort University, starting in October 2019.

The long term aim of the new University is to establish a series of novel Engineering and Management programmes in collaboration with its partners in UK, Europe and worldwide.

In order to support the long-term aim of the new University, Bahcesehir University and C4FF have signed collaboration agreements with several UK colleges and universities to implement joint degree programmes and research projects; in particular Bahcesehir University supported by the C4FF signed an MoU with De Montfort University; and C4FF has signed with a group of colleges and universities in the UK and elsewhere in Europe. Furthermore, C4FF intends to continue its top-up degree programme and MPhil/PhD with De Montfort University. As such, in the coming years the new University intends to be involved in the development and implementation of several degree programmes and taking responsibility for their own quality assurance and monitoring. The new University will also be involved in the fundraising, networking and planning in order to establish first a small centre and ultimately a full University campus jointly with C4FF and MarEdu in the UK.

C4FF was initiated by our Chairman, Professor Ziarati in 1981, which became a UK Government initiative early in 1980s and later nominated as one of the 10 UK's innovative projects in the EU's network of innovative projects EUROTECNET in 1984. The EUROTECNET formally ended in 1996 when C4FF opted to become a limited education and research company. The following files give the sample earlier collaboration with DfEE http://www.c4ff.co.uk/References/DfEE_Reference.pdf and sample DfEE publication on C4FF's work in EUROTECNET (<http://www.c4ff.co.uk/History.aspx>).

A review of our website www.c4ff.co.uk will indicate that we have helped to establish several universities overseas and have been involved with the UK Government acting as Quality Assessors and with several Chartered professional institutions as degree programme accreditors. Our involvement with major awarding bodies such as Pearsons/Edexcel/BTEC goes back to some thirty five years, offering degrees, HNDs and so forth – see for example www.maredu.co.uk and letters of commendation from colleges and universities in 'About Us' in the C4FF's website. We have



supported and are supporting British universities in several joint PhD programmes as supervisors or advisors and run joint degree modules with universities in the UK and elsewhere in Europe. We have initiated and supported several major European/global platforms; see for instance www.marifuture.org and www.manufuture.org. The former is still being coordinated by us. Our Centres have developed many e-learning courses with some given the award of 'Best in Europe' by the EU, and many are accredited by universities or institutions such as IMarEST. We are the initiator of the CDT (now just referred to as DT) A-levels and ran the first CDT teacher training course in the UK with support from the Welsh Office. Our history (<http://www.c4ff.co.uk/History.aspx>) lists the awards given to us and the work we have done with many colleges and universities in the UK. Recently we have established a network of people and organisations supporting STEM in schools (see our website: www.inspire-group.org) and are in the process of establishing a national Centre for it in our newly acquired building in Kenilworth.

Having worked with Turkey in recent years, see our sample partnership with them www.maredu.co.uk, and having helped to establish several institutions including two universities in Turkey (Dogus <http://www.dogus.edu.tr/en/> and Piri Reis <https://www.pirireis.edu.tr/EN>), we have decided to establish a private university in the UK in order to expand on the joint programmes and research projects we are currently carrying out in partnership with several universities in the UK, Turkey and elsewhere in Europe and worldwide.

It is worth noting that several organisations and universities have already established an office at the group's Business Centre, Berkeley House, in Kenilworth, and this has led to several funded and prestigious education and research projects. Examples of these projects can be found at www.marifuture.org.

New STEM Centre

Several other meetings were held to consolidate the success of acquiring the parcel of land from the Warwick District Council for the C4FF/MarEdu supported new university and for the C4FF's STEM partnership the UK. C4FF's business centre (Berkeley House) has already allocated another larger parcel of the land to be used for the coordination of the STEM centre and the new University planned activities.

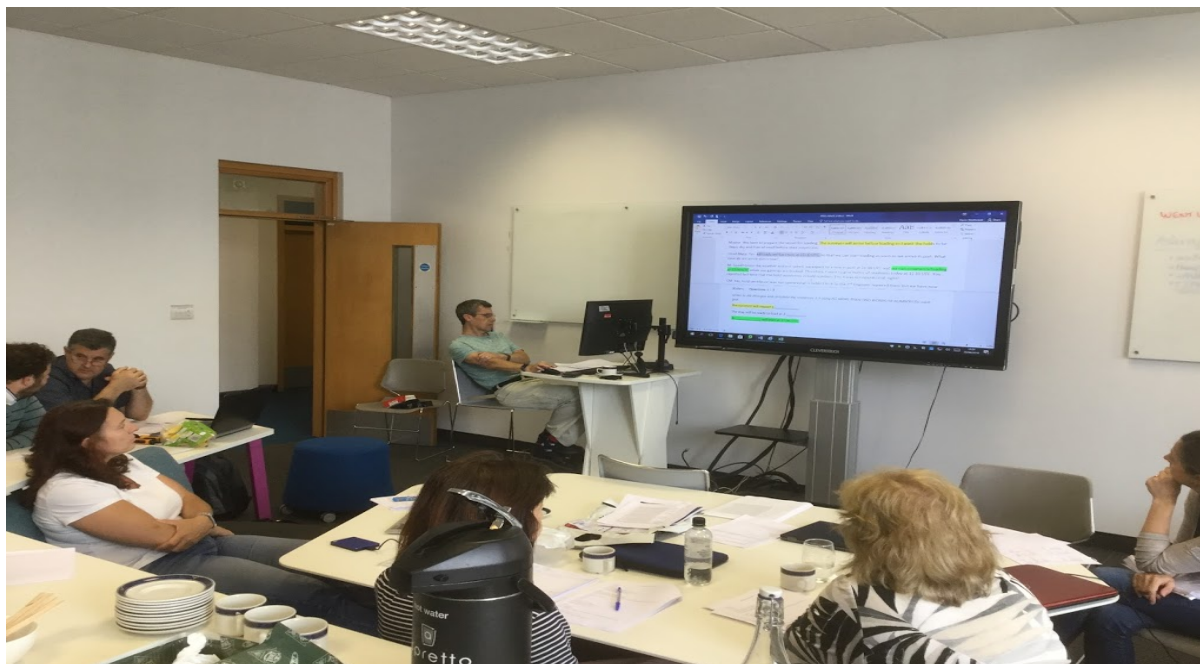
Year of Efficient Ship

The 'Year of Efficient Ship' continues in 2018 due to the importance in making our members and partners aware of the impact of toxic pollutants from shipping, the vast array of means are available to reduce the amount of the impact of these harmful emissions. To this end, we will be continuing our publication of a development paper on the subject of ship energy management in the coming months. To support 'The Year of efficient Ship' there were several major events in recent months. Notably several keynote speeches given by the MariFuture Founder, Professor Dr Reza Ziarati, at the International Propeller Club, Genoa, Italy; at Johnson Matthey Technology Centre, Reading, UK; and the MariEMS' final conference. The fourth ACTS Plus partner meetings took place on 22-23 April in Mallorca, Spain and on 24-25 May the third partner meeting for Career Comeback Support Program for Women project met in Poland. The final partner meeting and conference for MariLANG took place on 7-9 July in Elsfleth, Germany.



MariLANG Project

The final training week took place in Southampton on 18-22 June. The partners successfully completed the training to become certified in Language Test Standard Setting.



The final partner meeting and conference took place in Elsfleth, Germany on 7-9 July, hosted by Jade Hochschule the coordinator of the Mari LANG project.



The MariLANG project intends to develop a Maritime English training programme based on the EU funded SeaTALK learning materials and the EU funded MarTEL assessments, both of which are compliant with the IMO Maritime English Model (3.17). It is worth mentioning that partners from both SeaTALK and MarTEL were involved in the 2015 revision of the IMO Maritime English Model Course through the International Maritime Lecturers Association (IMLA). The funding of MariLANG is very good news as it will complete the process, started with MarTEL, establishing a Maritime English assessment system, followed by SeaTALK seeking material for it. In conclusion, MariLANG will develop an actual training programme for Maritime English, which will include the three new categories defined in the revised model course: Electro-Technical Officers, GMDSS radio operators, and Personnel providing direct service to passengers in passenger spaces on passenger ships.



Career Comeback Support Program for Women (CCSP-W)

The project started in September 2016. The partners have met in Istanbul, Kenilworth and Paris. The fourth partner meeting took place in Poland on 24-25 May. The subsequent meeting took place in Paris, France on 18-19 October 2018.

The project is progressing well and is being implemented as outlined in the proposal.

The Career Comeback Support programme for Women (CCSP-W) project, aims to increase the awareness of contemporary business environment for unemployed women who had work experience previously. By providing an Online and mobile platforms, as well as its relevant



curriculum, the programme encourages those women to get back into the workforce. The project consists of three objectives:

- 1) All types of job opportunities that would allow women to have flexibility and ease their return to work life will be allocated in a single platform. This part of study will assist women with the career-planning phase to help them see, in detail, the available options and also help them allocate types of jobs based on their interests and skills;
- 2) Those potential entrepreneur women who would like to run their own business will be assisted by provided networking and knowledge base tools.. Correspondingly, this study aims to introduce funding opportunities that are available to entrepreneurs in general and also specific to women to re-enter the workforce;
- 3) An Online platform in their own language and a mobile version of the platform will be provided to woman returnees to help them adapt to the social business era, considering possible opportunities and necessities in the new business world.



Career Comeback Support Program for Women (CCSP-W) France 18-19 October 2018.



Project Day time

Several meetings have taken place to consolidate the Turkish consortium and it is expected that partnership will be concluded during this month. The project concerns further development of the Industry 4.0 concept, which describes an important technological advancement, driving automation and data exchange in the manufacturing environment, to provide smart production with its efficiency improvements, while setting the requirements and needs for necessary and essential tools to specifically enable the change. In smart production, improvements and adjustments to the production processes can be achieved with effective Internet of Things (IoT), tools that analyse and manage the sensor-collected data using Predictive Maintenance (PdM) techniques. PdM is a right-on-time maintenance strategy designed to determine the condition of in-service equipment to help predict and decide when maintenance actions should be performed. Maintenance tasks are performed only when warranted, leading to cost savings over routine or time-based preventive maintenance. The basis for PdM is the Condition-based Maintenance (CBM) concept. CBM techniques are already used in many industrial manufacturing areas; the techniques include e.g. vibration analysis, lubricant contaminant analysis and process performance monitoring using information fusion techniques with multi-parameter measurements.



This project with a consortium of 45 partners meets the three challenges by deriving requirements from 14 industrial use cases in various industries; ranging from telecommunications, medical systems imaging, and automotive assembly lines to shipping industry. The project results will be widely disseminated to support digitizing European industry at large, which will benefit from efficient predictive maintenance techniques, with the project partners providing the enabler solutions to the market. The consortium is innovative in combining machine learning, Blockchain, simulations and modelling in order to achieve predictive maintenance. A unique feature of the projects is the integration of 14 industrial use cases, in various fields within the same consortium, to spread achieved learning widely in industry.

OPTIMUM

Several discussions have taken place after the first face-to-face meeting of this EUREKA ITEA multi-million EUR project took place in Germany on 12-13 March 2018; the 2nd meeting of the project team was held at University of Rostock in Warnemünde, Germany on 25th & 26th of June.

The proposed project aims to support innovative concepts for engineering, commissioning, control and supervision of smart manufacturing and material handling. It will be in line with European, National and international initiatives towards digital manufacturing, closely related to on-going activities in working groups around the German initiative Industry 4.0. Taking the results from ongoing architectural, component and ontology discussions, OPTIMUM's major goals are: improvement of the aspects of distributed control, adaptation of (I)IoT technologies to real industrial needs, enhancement of control and applications by context and location awareness as well as application design and common-model based 3D engineering and supervision.

There are over 20 major industrial partners supporting this project.



Figure 1 Professor Ziarati , flanked by Dr Anja Fischer, OPTIMUM Project Manager, and Dr Basak Akdemir, BAU, and members of the OPTIMUM project at their kick-off meeting, Wetter, Germany

IMLA 2018

A new paper on MariEMS is being prepared for presentation at the next IMLA Conference in Philippines. MariFuture presented two papers at the IAMU 2017. The first paper related to Avoiding Collision at Sea – Pareto Analysis and was presented early in the opening day of the conference on 11th October 2017. The second paper, Maritime Ship Efficiency Energy Management, was presented on 13th conference early in the morning. Both papers were well received. Several participants expressed interest to work with the MariFuture partners in initiating new proposals. More information on these developments was given in May 2018 news.

Professor Ziarati, C4FF, with support from the MariEMS partners, presented a lecture at the Johnson Matthey Technology Centre on 15th February 2018. The lecture highlighted the importance of digital twinning in product development and maintenance. The lecture summary is presented as the February 2018 Article on MariFuture.

MariEMS

The final report was submitted to UK NA at the end of May. Full accreditation documents were submitted to IMarEST. The partners have been notified that both the submission to UK NA and to IMarEST have been successful. The UK NA is expected to review and assess the final report in the



next two months. IMarEST has informed the project lead that the documents are being presented to its accreditation committee in the near future. We are expecting a positive outcome from both organizations.

The MariEMS final Conference took place on 22nd March 2018 in Istanbul. The event was very successful and it was reported that some 60 people participated in proceedings. The keynote speeches were given by Professor Ziarati, Chairman of C4FF, Mr Markku Mylly, the President of EMSA and Dr Sualp Urkmez, the CEO of Adiks Ship Yard and Furtran.

Keynote Presentations:



Figure 2. Professor Reza Ziarati, Chairman, C4FF and Founder, MariFuture giving the keynote speech at the MariEMS Conference, 22nd March 2018, Istanbul, Turkey



Figure 3. Mr Markku Mylly; President of EMSA presenting at the MariEMS conference, 22nd March 2018, Istanbul, Turkey



Figure 4. Dr Sualp Urkmez, President of Turk Deniz Egitim Vakfi (TUDEV) presenting at the MariEMS Conference, 22nd March 2018, Istanbul, Turkey



It was reported that all Chapters (excluding 13 and 14) have been reviewed and revised and texts borrowed from the IMO TTT course have been highlighted in the MariEMS 36 chapters which were based on the 8 modules of the IMO TTT course.

As reported earlier, the 36 chapters were disassembled and reassembled by combining several topic areas and later transformed into 14 new chapters. Partners were asked to review these chapters and comment on the changes necessary, they were also given tasks to prepare summaries and some quizzes for each of the chapters assigned to them. The summaries and quizzes are primarily for updating seafarers on ship energy efficiency subject matters and the 14 chapters have more demanding questions that are intended for cadet ship energy education and training. The more demanding question, concerns for instance, calculating EEDI for new ships and EEOI for existing ships in the market place. The course manual now includes a course of nominal 60 hours for cadets and a 3 to 5 days course for updating existing seafarers. Both options in the course manual are now ECVET compliant. The draft MoUs was finalised and signed between the two collaborating institutions for ECVET compliance. The process of seeking accreditation from a major internationally recognised professional institution with Royal Charter has also started. The accreditation documents, consisting of the course manual and the sample quality manual for it, together with the quality manuals of the maritime universities involved, plus teaching/training staff CVs were sent to IMarEST as advised by them. It is pertinent to note that the maritime universities are recognised awarding bodies in themselves. The course was piloted in Spain, as reported earlier, and the outcome was successful. MariEMS partners have held several presentations to date and intend to participate in the EU Maritime Day and the IMO Congress in the near future. They also participated on Cruises and learnt a great deal about the system Cruise ships have in place to reduce their energy consumption to a minimum.

Two papers have already been written and one presented at the prestigious International Association of Maritime Universities. The second one, a further journal paper on technical aspects of the project, was presented at the International Maritime Lecturers Association (IMLA) in October 2018. Some 24 papers have already published by MariFuture on various chapters of MariEMS learning material; see for example (http://www.marifuture.org/Reports/Development-Papers/ADP_03_2018_MARIFUTURE.pdf). Some of these publications have lead to new papers, articles and provided material for presentation at the multiplier events and new proposals. MariEMS' online Course and Book have now been finalised and will be available for circulation soon.

A summary of all the projects can be found on www.marifuture.org. For further information about MariFuture please refer to the MariFuture website.

Dr Martin Ziarati