



August-September 2023

New project

C4FF's safety at sea project has been approved by the EU. This project will run from C4FF's Sweden's newly established Centre. The project is a continuation of the C4FF's IMO ISM Code Study and was developed to provide an international standard for the safe at sea and for marine pollution prevention. Almost all ISM Code manual are required to take ISO 9000 Quality System and ISO 14000 Environmental Management Systems into account. The problem is that any form of procedural quality system such ISM does not necessarily improve safety for this reason a novel online course on ISM Code requirements and all relevant safety, environmental and quality standards is being proposed. There are a number of activities such as literature review of ISM Code requirements and its latest amendments as well as other relevant standards related to safety and environmental protection in the shipping industry. The project involves several case studies and research methodology for data collection which include interviews, surveys, and document analysis for improving the content of ISM Code and interpret its requirements and its correct implementation. The main output of this project is a complete competence-based online training course on ISM Code and its implementation. There will be a novel assessment system covering self-assessment, assignments and an oral test. The course will be ECVET and ECTS compliant and will be submitted for accreditation and certification to a professional and internationally known professional body.

This project is expected to start in November or December 2023 when staffing allocation process is concluded.

CSAMGuard project

C4FF Business Intelligence Team led by Dr Lakhvir Singh, has been awarded a major research project by UK Government to combat CSAM Links on the clear web. The CSAMGuard project introduces an innovative and advanced approach to address the critical issue of detecting and preventing the spread of Child Sexual Abuse Material (CSAM) links. This groundbreaking method leverages machine learning (ML) to significantly enhance accuracy and minimize false positives, surpassing traditional methodologies such as blacklisting and heuristic techniques. The project's core focus revolves around the development of two integral components: the Central CSAM Intelligence System (CCIS) and the Local CSAM Scanning System (LCSS). These systems work in tandem to create a comprehensive defence against CSAM links at both global and local levels.

Several other EU funded projects have also been either approved or are on the reserved list. More about this project in the next edition of the MariFuture News.

Virtual Reality

The Virtual Reality project has been concluded the final report has been submitted to the UK NA. This was a very interesting project and the outcome is expected to be used in several new projects/proposals. The applications of VR in the marine simulation sector are expected to have major impact on ship navigation and propulsion training programmes. The cost advantage in



medium to long term will help VR to replace or supplement many ship simulator systems.

Project Website: <https://lifeskillsvr.com/>

The UK Government embraces ITEA within the EUREKA programme

The C4FF chair, Professor Ziarati, wrote to the senior Ministers and the Government officials about the importance of embracing ITEA a programme at forefront of technological developments particularly now that the UK is no longer is participating in many of the EU research and innovation programmes. This is good news. ITEA programme are well assessed and are near market precisely what the UK needs. Some £6 million has been assigned to phase 1 which is expected to fund some 10 projects each of £600k value. C4FF has recently been involved with several successful ITEA projects and currently is part of a prestigious project called ENTA. The OPTIMUM project, C4FF first involvement with ITEA received outstanding award in all three Category. The Centre intends to support several consortia and play a major role in making ITEA a success in the UK.

A new climate change STEM competition for Schools

The success of the Climate Change Action for Air Quality school competitions last year, Professor Ziarati has with support from IMechE has produced another very interesting competition. Any school can take part in the competition.

Competition event

17 April 2023 00:00 - 31 August 2023 00:00

Status: Active

Description

WIN £250 PLUS £250 FOR YOUR SCHOOL

Enter our climate change competition and you could win **£250** to spend as you wish PLUS a further **£250** for your school. Winning entrants (plus one parent / guardian) will also be invited to the prestigious Institution of Mechanical Engineers - Midland Region Annual Dinner to be held at the Burlington Hotel in Birmingham in November where they will receive their certificate of achievement.

Closing date for entries is 31st August 2023

Competition rules

1. The competition is open to all students in full time school / academy education aged between 14 and 18 as of 30th September 2023.
2. The written article must be original work undertaken by the student.
3. The author shall not retain any copywrite on the article submitted and the article, or parts thereof, may be re-printed in the Institution of Mechanical Engineers (IMechE) publications.
4. The article will be between 10 and 12 pages in length, using Calibri 12 font, and including any pictures, graphs, etc. but excluding the title page and the bibliography.



5. The content of the pictures, graphs, etc must not be more than 40% of the complete article.
6. Students are encouraged to undertake research to establish facts and information and make reference to this. All, such references must be fully identified within the bibliography.
7. Closing date for receipt of all entries by email will be 31st August 2023 without exception.
8. All articles will be judged by a panel comprising members of the Institution of Mechanical Engineers – Midland Region and C4FF. The judges' decision is final.
9. Winners will be notified by 31st September 2023 and winners names and pictures will be displayed on the IMechE Midland Region website.
10. No correspondence will be entered into.
11. All entries must include the name, date of birth, personal photograph and school / academy name.
12. Two winners will each receive a personal payment of £250 plus a payment made to the winners' school / academy. Each, will also receive a personal invitation for themselves plus one parent / guardian to the IMechE Midland Region Dinner to be held at the Bulington Hotel in Birmingham on Friday 17th November 2023. Invitations are non-transferable.

Now – continue for the competition

Professor Dr Reza Ziarati – Chair, Centre for Factories of the Future (C4FF) – is trying to write an article on climate change. He has compiled a series of notes in preparation for the article but now needs your help to bring all this together, undertake some deeper research and compile a suitable article for publication.

Your article must include all the key points identified by Professor Ziarati and much more additional information you may be able to find by research. Please include relevant pictures, graphs, diagrams and other such data which will make the article become very useful to the reader.

The target readership for this article will be both the specialist engineer / scientist / environmentalist as well as the general public who will have an interest in this subject – very relevant in today's world. Therefore, your article will need to contain some good technical detail but also be very readable for everyone.

Professor Reza's notes

Energy cannot be produced or destroyed but can be transformed from one form into another. Higher temperatures have negative effects, and the higher CO₂ emissions the higher is the atmosphere's temperature. **We need to bring CO₂ emissions to Zero if the global atmospheric temperature is to remain unchanged.**

USA is major user of energy. The average price of Electricity in US dropped from \$2.5 in 1900 to \$0.1 in 2020 (\$ per kWh at 1990 prices). In fact the average price of electricity has dropped



rapidly in the Western world and in many countries worldwide albeit not at the same rate as in the West. Yet, global carbon emissions from energy transformation have gone up from Zero in 1850 to almost 35 Gigatonnes in 2020. There has been almost an exponential rise in CO2 level. This is alarming. **26 billion tons of CO2 per year; more tons/person in the West/developed world and a lot less tons/person elsewhere, on average 5 tons per person worldwide.** This is unacceptable.

CO2 emissions are directly proportional to world population (P), CO2 per unit energy (C), Services per person (S) and Energy per service (E), namely:

$$\text{CO}_2 = P \times S \times E \times C$$

If P goes up S will go up too but although E may drop and this may lead to a lower C, the anticipated increases in population and current upward trend for greater need for Services would mean huge increases in CO2. So far CO2 levels have not been falling and we need a miracle to reduce CO2 level to maintain a safe global temperature.

There are no easy solutions. Wind, Solar and Hydrogen have huge problem of transmission and storage but the cost of transformation of free wind and solar energy to clean and usable energy is falling. **One solution could be Nuclear and use of small, safer and highly efficient units spread over the globe rather a few numbers of huge power plants.** In any case, nuclear energy has its problems of cost, safety and long term storage. Another partial solution is carbon capture and its storage which poses serious engineering challenges of affordable cost, suitable locations and long-term stability.

One method suggested by me was conversion of wind energy to potential mechanical energy (Reza's Coil) and its storage. This one potential area which can have a huge potential as it removes the storage problem of wind energy.

On electrical energy all the batteries on earth can store about 30 minutes of the world's energy needs. There is a great deal about cars. Toyota which is the world's largest automakers, recently reiterated an opinion it has offered before. That opinion is straightforward: **The world is not yet ready to support a fully electric auto fleet.** Just 2% of the world's cars are electric at this point. **There are 289.5 million cars just on U.S. roads as of 2021. About 98 percent of them are gas-powered.** Toyota selling 81% of its cars in the US warns that the grid and infrastructure simply are not there to support the electrification of the private car fleet. A 2017 U.S. government study found that we would need about **8,500 strategically-placed charge stations to support a fleet of just 7 million electric cars.** That's about six times the current number of electric cars but no one is talking about supporting just 7 million cars. **We should be talking about powering about 300 million within the next 20 years, if all manufacturers follow GM and stop making ICE cars. £300 million cars are still a drop in ocean and who is here in 20 years' time.**

Transport is a major polluter. Electrifying the auto fleet will require a massive overhaul of the power grid and an enormous increase in power generation. Hence the reason for success of Hybrid. Read my award prize winning and national diploma award paper to know why the time for hybrid vehicles is with us



- http://www.c4ff.co.uk/history/papers/Emerging_transportation_system.pdf and compare what I and others are now saying <https://www.marifuture.org/Publications/Papers/imeche-transport-hierarchy-report.pdf>. The latter paper is very pro rail and does not see any reasonable solution to existing aviation fuel.

With regard to UK Government actions:

- The impact of global energy supply disruptions have led to a surge in household bills and slowed economic growth across the globe. To this end, the UK government has intervened to mitigate these effects by covering around half of the typical energy bill.
- It plans to expand the use of renewables, revive nuclear power and build new industries such as carbon capture, which is expected to create jobs across the country, provide new opportunities for British businesses at home and abroad, and endure the UK intention of reaching net zero by 2050.
- The emphasis is on accessing cheap, abundant and reliable energy as the foundation for a thriving economy hence the new focus on Energy Security but trying to accelerate the move to cleaner, cheaper, and home-grown energy through strategies such as the Green Finance Strategy.
- The government has already announced a series of measures aimed at bolstering its efforts to boost the UK's energy supply, cut carbon and drive bills down. Among the key initiatives are a commitment to carbon capture usage and storage (CCUS) and a £160 million fund to support port infrastructure projects to kickstart investment in the UK's emerging floating offshore wind industry, while the first tranche of green hydrogen production projects is set to receive backing under the £240 million Net Zero Hydrogen Fund.
- This together with the fifth round of the UK's Contracts for Difference scheme, aimed at incentivising investment in renewable electricity, will be backed by a budget of £205 million and the new competition to select the best small modular reactor technologies will, it is said, help the UK towards the set Net Zero targets in 2030 and 2050.
- In parallel the government is speeding up the planning process to attract investment, reforming it to enable the building of more energy infrastructure, including solar power and offshore wind projects, more quickly.
- Other measures include more support for energy efficiency by reducing reliance on fossil fuels to heat buildings with a £30 million Heat Pump Investment Accelerator as well as boosting the UK's electric vehicle charging points and infrastructure with an investment of over £380 million.



- The most potent tool is the UK Export Finance provided with an extra £10 billion capacity to boost exports, including from the UK's world-leading clean growth sectors.

The big question is, “are all these efforts going to reduce carbon emissions by 68% from 1990 levels by the end of the decade as pledged in the Paris Agreement?”

Maybe your article will help to answer some of these questions.

OR

Maybe your article will bring up even more unanswered questions which need to be addressed

When your article is complete, please send a copy by email to:

reza.ziarati@c4ff.co.uk

and

john.butler276@btinternet.com.

Please check carefully the competition rules and ensure that your article complies.

All entries will be acknowledged so if you have not received confirmation of receipt within 7 days of submission, please contact us further.

We look forward to hearing from you.

The information about the last year winners is given below:



Air Quality / Climate Change School Competition

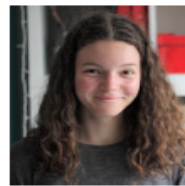
To coincide with the 2021 United Nations Climate Change Conference (COP26) held in Glasgow in November last year and the launch of the 175th anniversary year for the Institution of Mechanical Engineers (IMechE), The Midland Region of the IMechE, together with the Centre for Factories of the Future (C4FF), organised an air quality / climate change competition for secondary schools.



Anisa Tasnim Begum

Pupils were asked to study a highly technical, abridged 16 page report on air pollution and to answer a series of questions. They were then required to compose a 500 word essay on "how you / your family can make changes to your lifestyle and/or other actions which will result in the reduction of greenhouse gas emissions."

Two winning entries were chosen – Anisa Tasnim Begum (14) from King Edward VI Five Ways School in Birmingham and Miriam Clements (16) from Rugby High School. Both pupils win £250 plus a framed certificate and their schools also receive £250 to be spent on STEM activities.



Miriam Clements

Professor Dr Reza Ziarati – Chair, Centre for Factories of the Future and author of the technical paper used in the competition said, "We were impressed by the quality of these two entries. It was clear that both girls fully understood the problems we are facing today with climate change and air quality and they had given very good essays on ideas for tackling the problems. Clearly they had researched into the problem."

The full report: Pollution in the Air – A Local and Global Concern can be found at:
https://www.marifuture.org/Reports/Development-Papers/ADP_09_2020_MARIFUTURE.pdf
https://www.marifuture.org/Reports/Development-Papers/ADP_10_2020_MARIFUTURE.pdf

John Butler. Education Officer – Institution of Mechanical Engineers, Midland Region.

The Climate Change Action for Air Quality Conference

The conference this year takes place on 2nd June 2023 and is hosted by Coventry University.

Climate Change Action for Air Quality conference 2023

Central England Air Quality People's Chamber (CE-AQPC) - www.cwairquality.com

The emphasis of the conference this year is on the government and the local councils **Net Zero plans**. Almost all councils have now drafted their Net Zero Plan and this is the first time we have a Minister responsible for Net Zero.

The CE-AQPC (www.cwairquality.com) has been involved with interacting with the Government ministers, local MPs, many councillors, academics, engineering and medical profession to identify areas that the local communities and resident associations, businesses and individuals can engage in to ensure that the air quality improves and the global warming is no longer a threat to mankind.

The activities involved a range of climate change initiatives including STEM and college university student projects and school competitions as well as lectures and workshops supported by engineering institutions. Some of the projects and papers produced were classified as outstanding by major national and international bodies such as the UN, EU and so



forth. The winners of the national climate change school competition 2022 were two young ladies who were presented with a certificate and two cash prizes at the IMechE Dinner function organised to celebrate the Institution's 175th Birthday. Some of the activities can be viewed at the CE-AQPC website or for instance at

<https://www.marifuture.org/Publications/News/October-November2022News.pdf>

With regard to the Government actions, the recent efforts primarily focused on the impact of global energy supply disruptions. Such disruptions have led to a surge in household bills and slowed economic growth across the globe. The Government has already announced a series of measures aimed at bolstering its efforts to boost the UK's energy supply, cut carbon and drive bills down.

Among the key initiatives are a commitment to carbon capture usage and storage (CCUS) and a £160 million fund to support port infrastructure projects to kickstart investment in the UK's emerging floating offshore wind industry, while the first tranche of green hydrogen production projects is set to receive backing under the £240 million Net Zero Hydrogen Fund.

This together with the fifth round of the UK's Contracts for Difference scheme, aimed at incentivising investment in renewable electricity, will be backed by a budget of £205 million and the new competition to select the best small modular reactor technologies will, it is said, to help the UK towards the set Net Zero targets in 2030 and 2050. In parallel the government is speeding up the planning process to attract investment, reforming it to enable the building of more energy infrastructure, including solar power and offshore wind projects, more quickly.

Other measures include more support for energy efficiency by reducing reliance on fossil fuels to heat buildings with a £30 million Heat Pump Investment Accelerator as well as boosting the UK's electric vehicle charging points and infrastructure with an investment of over £380 million and. The most potent tool is the UK Export Finance provided with an extra £10 billion capacity to boost exports, including from the UK's world-leading clean growth sectors. **The question is are all these efforts going to reduce carbon emissions by 68% from 1990 levels by the end of the decade as pledged in Paris Agreement?**

Climate Change and Air Quality affects us all, so if you have something to say or wish to hear the views of the Government, local politicians and specialists on recent actions regarding Net Zero and the reactions from the local communities and many organisations and individuals from a range of background please register for the conference by writing to Lena at lena_kendall@yahoo.co.uk. Attendance to the conference is free and refreshment and lunch is provided.

The latest draft programme is as follows:





Climate Change Action for Air Quality 2023 Conference Standing Agenda

Date: 2nd June 2023 – **Venue:** Coventry University

Conference Title – Net Zero Plans

Main Aim - To bring all the key stakeholders in the region, and from wider afield, to discuss climate change and how to manage the impact of poor air quality on local residents

Target Audience - Local resident associations, local universities, local councils, local MPs/MEPs, national and government representatives, local environmental groups, air quality specialists

Purpose

- To gain a wider understanding of the local and national **Net Zero Plans** and their impact on air quality
- To understand what we currently measure and consider its adequacy
- To communicate the above understanding to the widest possible audience
- To share the evidence based on the health and social impacts of climate change actions and poor air quality
- To share good practice
- To understand the likely impacts of Net Zero Plans and poor air quality on cities such as Coventry and towns like Leamington Spa (to be aware that air quality does not differentiate administrative boundaries)
- To consider possible ways to mitigate against poor air quality
- To agree next steps towards cleaner local air

Programme

09:15 - 09:30 Arrival and Coffee/Tea

09:30 - 09:40 Introduction and the Expected Outcome

Professor Dr Reza Ziarati, Chair, C4FF

09:40 – 09:55 SolarButterfly

Session 1 Local and National Net Zero Plans

Chair Professor Reza Ziarati

09:55 - 10:05 Welcome Address

Councillor Coventry Lord Mayor

10:05 - 10:35 The National and Local Perspectives – Responses to the UK Net Zero Plans

10:05 – 10:20 Government Message

10:20 – 10:35 Anita Dolton introducing

Keynote speech Mr Mark Pawsey – Member of Parliament for



Rugby

10:35 – 10:55 Morning Keynote Speech: Air Pollution Developments

Chair: Dr Lakhvir Singh

Professor Roy, Harrison, OBE FRS

Queen Elizabeth II Birmingham Centenary Professor of Environmental Health,
Birmingham University

10:55 - 11:05 Q/A

Session 2 Effective, Efficient and Green Transport

Chair: Associate Professor Patricia Ashman, Coventry University

11:05-11:20 The Health Impact of Poor Air Quality

Professor Abdul Rashid Gatrad

11:20 – 11:35 Transient Emission of NOx

Dr Mark Peckham, Director, Combustion

11:35 - 11:50 Tea/Coffee Break

11:50 – 12:05 Net Zero Plan

Cllr Andrew Day – WDC Leader

12:05 – 12:15 Q/A

Session 3 Climate Change Student Projects

Nwabueze Emekwuru, Coventry University

12:15 - 12:25 Coventry University student projects/SIG Particulate Matters projects
Student Project Groups

12:25 – 12:40 Making Coventry's Solar Future

Tony McNally, Solar Panel Project

12:40 – 12:55 Review and address of the public responses to the '30 questions' - Q &A

Session 4 Technical Section - Emissions & Air Quality Measurement

Chair Dr Svetlana Alexandrova – Leicester University

12:55 – 13:10 Keynote Speech: Mr Matt Western – Member of Parliament for Warwick & Leamington and Shadow Minister for Higher Education

13:10 – 13:25 IMarEST Lecture Air Quality during Commuting

Professor Amin Al-Habaibeh PGCHE, BSc, MSc, PhD, CEng, MIET, FHEA

Professor of Intelligent Engineering Systems; Nottingham Trent University



13:25 – 13:40 **Towards Personal Environmental Monitoring**
Professor James Covington, Warwick University

13:40 - 13:50 Q/A

13:50 - 14:30 **Working Lunch**

Session 5 **Importance of Preserving Nature**
Chair Ann Wilson

14:30 - 14:45 **Afternoon Keynote Speech: Importance of Saving Trees – Study of the diversity of microorganisms in trees**
Professor Hendrik Schaefer, School of Life Sciences, University of Warwick

14:45 – 15:00 **Clean Air Warwickshire - The role of a community organisation in improving air quality**
Chair Clean Air Warwickshire

15:00 – 15:10 Q/A

Session 6 **Engineering Institutions**
Chair John Butler

15:10- 15:25 **Work by Engineering Institutions & Business - Hydrogen Train, Climate Action new School Competition & several other STEM activities including IMechE funded Air Quality Sensor and IET and IMarEST STEM Projects** John Butler (IMechE), Kevin Blacktop (IMechE), Howard Warrener (IMechE) and Derrick Willer (IET), Paul Burrows (IMarEST)

15:25 - 15:40 Coffee/Tea Break

15:40 – 16:00 **STEM Initiatives**
Nicola Davidson, C4FF and Eiraya Education

16:00 - 16:15 **Regional/local issues**
Planning matters, Barford, new homes, Progress House, Nuneaton/Bedworth, HS2
Cllr Keith Kondacor

16:15 – 16:30 Practical actions to tackle air pollution
Cllr Mattie Heaven – Wainbody Councillor and Shadow Cabinet Member for City Services, Coventry Council

16:30 – 16:40 Q/A



- 16:40 **Final Remarks and Actions for the Future**
Professor Reza Ziarati
- 16:50 **End of Conference**



Appointment as the Chair of the Region

Professor Dr Reza Ziarati was dully elected as the regional Chair of Marine Engineering, Science and Technology for 2023 and handed over the Chair of Region for the Institution of Mechanical Engineering to Kevin Blacktop

Passing the badge of IMechE Midland Region office to the new Chair



The photo above shows the medallion of IMechE Midland Region being passed from Professor Reza Ziarati, the current Chair to the new Chair Kevin Blacktop at the IMechE 175th Anniversary.

C4FF New Article's Impact

A recently published article

https://www.marifuture.org/Publications/Articles/Tackle_Harassment_Head_On.pdf in

Marine Professional has had a major impact in the maritime industry. Several countries have declared their interest in pursuing the recommendation in the Article of IMO to take bullying and harassment in the maritime sector more seriously. The US Government at the HTW 9/7/1 has proposed a Comprehensive Review of the 1978 STWC Convention and Code. They have proposed mandatory training provisions to address the prevention, awareness, bystander intervention, reporting and response to bullying and harassment including sexual assault and sexual harassment.



C4FF discussion with the UK Administration (MCA) has indicated the C4FF article and the subsequent US paper is worthy of further consideration. MCA has informed C4FF that they will review both documents and will inform C4FF of their decision. Finland and Spain as well as Poland may also join to support C4FF's and US paper in any future HTW discussions.

DESSEV – Planning for the next pandemic

The project partners are planning the second project meeting. The first meeting of the project took place in Warsaw, Poland on 14-16 November 2022. The meeting was successful and outline the plan for the project implementation and discussions on the role of each partner and the consortium as a team.



The project is devoted to issues related to the outbreak of an epidemic on the sea-going vessel. In practice, the vessel becomes a moving isolator with a great potential to "release" the disease over a larger area. The COVID-19 outbreak has demonstrated that in many places there are no mechanisms for dealing with disease emergencies. Although many agreements and contracts anticipated "force majeure" risks, no one was aware of the fact that this could be global. COVID19 has shown that very often existing procedures are not adapted to the reality around us. Very often, new ones need to be developed quickly. Sometimes there is even no legal basis to implement and apply such procedures. Different solutions related to the coronavirus threat have been adopted in each country. Some actions turn out to be right, some don't. Unfortunately, in many cases the social factor is also important (opposition to vaccination, lockdowns, etc.). Sometimes, however, we find ourselves in a situation where we cannot wait for new procedures to be developed. COVID-19 has had a negative impact on almost all areas of the economy. It can be said that it is the greatest global threat since the Second World War. The aim of the project is to build an expert system regarding the risk of epidemic threats on a sea-going vessel (not only COVID-10). More about the project will be presented in January 2023.

Technology Challenges Seminar

A seminar was organised by the UK Fluids Network SIG on the means to address urban air quality. Professor Reza Ziarati, C4FF Chair, gave the speech on 'Pollution from transport system:



a strategy for sustainable transport systems', summarising the finding of IMechE COP26 findings and recent discussion which took place at the recent Air Quality People's Chamber. A copy of his slides and notes are available to interested parties and can be requested from C4FF (info@c4ff.co.uk).



Technology challenges for addressing urban air quality

University of Nottingham, December 7th, 2022

Energy Technologies Building, Room B27, Jubilee Campus, NG7 2TU

AGENDA

09.45 – 10.00	Arrival and welcome
10.00 – 10.30	Reza Ziarati (Centre for Factories of the Future) <i>Pollution from transport systems: A strategy for sustainable transport systems</i>
10.30 – 11.00	Matteo Icardi (University of Nottingham) <i>Particulate flows in porous media: multiscale analysis and numerical simulations</i>
11.00 – 11.15	Break/discussions
11.15 – 11.45	Andrew McMullan (University of Leicester) <i>Towards Combining Virtual Reality with Large Eddy Simulations of Urban Environment Flows</i>
11.45 – 12.15	Jose Martin Herreros (University of Birmingham) <i>Characterisation of emissions from multiple sources</i>
12.15 – 12.45	Tim Watling (Johnson Matthey) <i>A compressible flow model for symmetric and asymmetric particulate filter backpressure</i>
12.45 – 13.30	Lunch break and discussions
13.30 – 14.00	Richard Taylor (Nottingham City Council) <i>The Environment Act 1995 Part 3 - Local Air Quality Management. A practitioner's experience</i>
14.00 – 14.30	Mark Peckham (Cambustion) <i>Identifying individual high-emitting vehicles</i>
14.30 – 15.00	Mark Dewey (Lubrizol) <i>Fuel and lubricant technology for lifetime low emissions</i>
15.00	Closing remarks and networking

Further information and contacts

[Registration link](#) [Parking information](#) for visitors
Information for [travelling to Jubilee campus](#) Parking zones on the Jubilee [Campus map](#)

Dr Svetlana Aleksandrova
University of Leicester
sa1020@leicester.ac.uk

Dr Humberto Medina
University of Nottingham
Humberto.Medina@nottingham.ac.uk

Dr Andy Williams
University of Chester
andrew.williams@chester.ac.uk

IMEchE STEM Workshop

There was a meeting of STEM Ambassadors in London organised by the Institution of Mechanical Engineering (IMEchE). The meeting helped to work with the STEM toolkit



developed and promoted by the IMechE. Kits are available free of charge to any organisation wishing to use it to promote STEM at schools. There are also STEM Ambassadors willing to help to run workshop at schools.



STEM Ambassador Training Event at IMechE HQ, London, 13th October 2022

A further meeting took place to inspire the local community to promote the low carbon network. The meeting/workshop was sponsored by the RSA and the local net zero community in Warwickshire. Professor Ziarati made a presentation at the event to describe the work of C4FF with regard to the climate change projects (www.cwairquality.com) and STEM Inspire group activities (www.inspire-group.org).

A visit has been organised near Stratford to view the work of the Heart of England Community Energy Solar Farms with the students at Warwick University and Coventry University.

A visit has also been scheduled to Warsaw to attend the first partner meeting of a new project devoted to exploring solutions to issues relating to the potential outbreak of an epidemic on a sea-going vessel. The visit is planned to take place 13-15th November 2022.

Winners of C4FF-IMechE School Climate Change for Air Quality Competition have been invited to attend the IMechE national Engineering Dinner in November in Birmingham (<https://events.imeche.org/ViewEvent?e=7528>). The students' parents and teachers have also been invited.

C4FF helped to finalise the final report for the EU funded GreenShip Project and prepared the Project Results. These reports will be submitted to the Spanish NA. They also assisted to finalise the EU funded PROMETHEAS final report for the Polish NA. C4FF is currently preparing the final report for EU funded PoliUniBus Project.

The next meeting of Air Quality People's Chamber is scheduled for 4th November 2022. At this meeting the C4FF Air Quality Sensor, jointly developed with IMechE, will be presented.





C4FF-IMEchE New Air Quality Sensor for STEM Activities in Schools

The C4FF Chair attended the annual chancellor's dinner event organised Coventry University (CU). The CU has formed many successful partnerships and C4FF works very closely with CU particularly on students' projects. The Chancellor, Margaret Casely Heyford summarised some of the university's major achievements.



The Chancellor, Margaret Casely Heyford speaking at the Chancellor's Dinner, 15th October 2022, Coventry University

Outstanding success

Our **OPTIMUM** project is selected for this year's **Exceptional ITEA Award of Excellence for outstanding results in all three categories'** viz., Innovation, Business impact and Standardisation.

Congratulations to Anja Fischer and all at Demagcranes researchers as well as to all partners. This is a cause for big celebrations.

The New Erasmus+ Project (DESSEV)

The project is devoted to issues related to the outbreak of an epidemic on the sea-going vessel. In practice, the vessel becomes a moving isolator with a great potential to "release" the disease over a larger area. The COVID-19 outbreak has demonstrated that in many places there are no mechanisms for dealing with disease emergencies. Although many agreements and contracts anticipated "force majeure" risks, no one was aware of the fact that this could be global. COVID-19 has shown that in many instances, existing procedures are not adapted to the reality around us. Very often, new ones need to be developed quickly. Sometimes there is even no



legal basis to implement and apply such procedures. Different solutions related to the Corona virus threat have been adopted in each country. Some actions turn out to be right, some don't. Unfortunately, in many cases the social factor is also important (opposition to vaccination, lockdowns, etc.). Sometimes, however, we find ourselves in a situation where we cannot wait for new procedures to be developed. COVID-19 has had a negative impact on almost all areas of the economy. It can be said that it is the greatest global threat since the Second World War. The aim of the project is to build an expert system regarding the risk of epidemic threats on a sea-going vessel (not only COVID-10). Every merchant ship, pleasure craft, sailing yacht have to be equipped with appropriate communication equipment associated with her area of movements. It may be radio, satellite station, mobile phone etc. Each of them determines different way to obtain medical assistance (or advice). In addition radio operators on board of the ship must be certified by authorized organization and familiarized with maritime radio communication procedures. There are couple types of radio operator certificates depends on their purpose. For example, the most common is SRC (Short Range Certificate) used by sailors and the GOC (General Operator's Certificate) required by STCW (Standard for Training Certification and Watchkeeping) for deck officers. The motivation of the project is to deliver an expert system which may be helpful to resolve: i) how non-medical personnel can accurately access medical situation; ii) which medical facility should be contacted with; iii) what means of communication should be used.

So, the aim of the project is to design and develop the decision support system for maritime decision makers in order to give some indications in the case of epidemic outbreak. Example of operation: one crew member falls ill on board the ship; he was given medical attention. Two more people fell ill the next day. The captain begins to suspect an epidemic (infectious disease, food poisoning). Quickly checks the identified symptoms in the system and on this basis, the system provides guidance on actions - how to provide medical assistance, what services to inform, what procedures to implement. Epidemic alert!

Partners: AKADEMIA MORSKA W SZCZECINIE AM, SATAKUNNAN AMMATTIKORKEAKOULU OY, SPINAKE PROIZVODNJA TRGOVINA IN TRZENJE DOO, UNIVERSITAT POLITECNICA DE CATALUNYA, AINTEK SYMVOULOI EPICHEIRISEON EFARMOGES YPSILIS TECHNOLOGIAS EKPAIDEFSI ANONYMI ETAIREIA, CENTRE FOR FACTORIES OF THE FUTURE LIMITED and UCZELNIA MEDYCZNA IM. MARII SKŁODOWSKIEJ-CURIE

New Eureka Project

ENTA - The new Cyber Space project will deliver an encrypted traffic analysis service platform for cyber security. The platform will support a number of basic building blocks necessary for any Machine Learning (ML) and Deep Learning (DL) based traffic analysis. C4FF is pleased to be involved in this interesting and innovative project and disseminate and exploit the project outcomes in its network in UK and across Europe. C4FF has been involved in several EUREKA projects and currently support two ITEA3 projects. The new research project now is called ENTA which will commence shortly. C4FF will use the findings of this project to support its local Cyber Space project to ensure small companies in its locality would also benefit from this outcome of ENTA research work. ENTA has already been approved and Cyber Space is also



expected to be approved by the UK Government soon. In support of its efforts in countering cyber espionage and attacks, the Centre for Factories of the Future (C4FF) has developed a full degree programme and various modules have already been tested at associated universities including C4FF's own university, namely, University Centre Garden City (UCGC). Furthermore, C4FF has started a new project named Cyber Space to help, mainly, very small businesses to cope with the complexity of computer systems and networks, and become cyber security safe. C4FF is an RTD capacity based in Coventry and Kenilworth (UK). C4FF is the instigator of the Factories of the Future projects in the UK and supported similar developments in the EU. Since the company was founded in 1996, C4FF has gained extensive experience in participating and coordinating EU and UK funded R&TD projects in areas such as: Artificial Intelligence Systems, Cyber Security, Sales Forecasting, Market Intelligence Knowledge Extraction, Innovation Management, Factory Automation and Enterprise Resource Planning. C4FF has several ICT, manufacturing facilities and laboratories worldwide. These laboratories are equipped with the most up-to-date facilities. We also have access to several laboratories in several partner institutions. C4FF has an established reputation for developing novel manufacturing systems and software for factory management, including for lean practices. We also have many years of experience in ICT and Manufacturing research and development, as well as cyber security. Cyber Security is of particular interest to C4FF Maritime Division supporting the shipping industry against cyber-attacks.

A decision is being made to deliver the ENTA project through new C4FF centre in Sweden.

Partners: Solana Networks (Canada); BEIA GmbH (Austria); Dalhousie University (Canada); Metodos y Tecnologia (Spain); Ruag AG (Switzerland); Centre for Factories of the Future Ltd (United Kingdom)

Greenship - The final partner meeting and the final Conference of GreenShip project took place in Barcelona, 30th June and 1st July 2022 respectively. The programme for the Conference is as follows:



Co-funded by the
Erasmus+ Programme
of the European Union



UNIVERSITAT POLITÈCNICA DE CATALUNYA
BARCELONATECH
Facultat de Nàutica de Barcelona

TOWARDS ZERO SHIP EMISSION-GREENSHIP PROJECT
2019-1-ES01-KA202-065523
FINAL CONFERENCE AGENDA



30th JUNE 2022
FACULTAT DE NÀUTICA DE
BARCELONA - PLA DE PALAU, 18,
08003 BARCELONA

FROM 10:00 h. TO 12:30h.

10:30h: Welcome and project introduction by Germán de Melo and Reza Ziarati Coordinators of the project.

10:40h: Official welcome by Agustín Martín Mallofré - Dean of Barcelona School of Nautical Studies, IMO Ambassador.

10:50h: Keynote Speech 1: Introduction and results of the GREENSHIP project by Prof. Dr. Reza Ziarati - President C4FF and coordinator of the project.

11:20: Keynote Speech 2: Emissions from the ships in the Barcelona Harbour by Joaquim Cortés - Responsible of atmospheric medium - Environmental sustainability.

11:50: Keynote Speech 3: Measures to be adopted to reduce emissions into the atmosphere from ships by Benito Nuñez Quintanilla, Director General de la Marina Mercante -

12:00 Discussion Podium: Keynote Speakers 1, 2, 3.

12:30: Networking the GREENSHIP project and coffee and finger food





Conference was attended by a number of national and international participants. Here are some photos:





The above photos show the introduction of the Speakers by Professor German de Malo Rodrigues and the keynote speech by Professor Dr Reza Ziarati, Chair, C4FF. The following is the UPC's Maritime Faculty's plaque presented to Professor Ziarati.



The key message from Professor Ziarati was that the shipping industry is responding well to the challenges of climate change. The international legislation and creation of Emission Control Area have encouraged many shipping companies to seriously reduce their fuel consumption and take measures to reduce ship emissions. There are now examples of ships propelled by electric, LNG, Methanol, Hydrogen, Flettner rotors and novel sails. It has been reported that a Greek Company, Avin, has placed an order in China for a ship which is expected to run on Ammonia and Maersk has placed an order for a ship to run on E Methanol. However, all efforts so far have not led to the reduction of CO₂ from shipping. To this end, the GreenShip project is an important project which must continue considering that the industry and the profession have failed to reduce the GHGs emissions from ships and that the projections for 2050 are not



promising as the regulating UN body for the shipping industry, IMO, has predicted not a fall but a rise of 5 to 30% in CO₂e emissions into the atmosphere by 2050.

GreenShip Report from Topmasts¹

By Laureano Carbonell Relat - Overseas Corresponding Member for Spain

Towards Zero Emission GreenShip Project On 30 June 2022, the Barcelona Facultat de Nàutica (School of Nautical Studies), which is affiliated the Technical University of Catalonia (UPC, BarcelonaTech), held the Final Conference of the Towards Zero Emission GreenShip Project, co-funded by Erasmus+ Programme of the European Union, aiming to ultimately eliminate harmful emission of gasses to the atmosphere by ships, and reduce or eliminate its effects on climate change. The session began with a welcome given by the co-ordinators of the project, the professor nautical studies, Dr Germán de Melo Rodríguez, and Dr Reza Ziarati, emeritus and visiting professor in several centres and countries, founder and president of the Centre for Factories of the Future. Then Dr Agustín Martín Mallofré, Dean and professor of the School of Nautical Studies and IMO (International Maritime Organization) Ambassador, gave the official welcome to the delegates. The first speech, Introduction and Results of the GreenShip Project, was given by Dr Reza Ziarati, widely illustrated with the projection of many images and schemas, and finished with a list of his most important recommendations. The second was Joaquín Cortés Campa, responsible for the Atmospheric Environment of the Port of Barcelona. He spoke about Emissions from the Ships in the Barcelona Harbour and explained the plan to improve air quality in the port, initiated in 2016, and constantly updated, together with the projection of numerous illustrations, data, and schemas. The third and last speech was given by Benito Núñez Quintanilla, Director General of the Merchant Navy, under the title Measures to be Adopted to Reduce Emissions into the Atmosphere from Ships who detailed and explained the measures currently in force to reduce emissions from shipping. Then was a general discussion between the 60 delegates, about the issues raised by the three speakers. Topmasts no. 43 36 The session, in English, ran from 10:00 to 12:30, with refreshments and an opportunity for further discussion between delegates. Laureano Carbonell Relat Overseas Corresponding Member for Spain

GreenShip Success

As reported in the previously, C4FF's University Centre (Garden City) supported the development of two new courses in Technological Innovations and Research Methods. The courses were submitted to the Institution of Marine Engineering, Science and Technology (IMarEST). Both courses were received recognition as IMarEST CPD courses. C4FF also submitted the GreenShip Course documents for evaluation and we are pleased to announce that the Course received recognition from IMarEST. In parallel, a course in improving mental

1 Topmasts August 2022 No. 43 The Quarterly Newsletter of The Society for Nautical Research



health at sea and eradicating bullying is being developed with several partner organisations in the EU.



GreenShip Certificate



PROMETHEAS Project

The last face-to-face meeting of PROMETHEAS project took place in Szczecin in Poland on 16-17 June 2022. The main objective of the meeting was to review the progress being made with regard to course content and its digital platform and application. A further meeting took place on 25th July to monitor progress and plan future meetings in September 2022.

As reported in the earlier MariFuture News there have been several multiplier events, three taking place in the UK. The first multiplier event in the UK was organised jointly by UK Special Interest Group for seafarers mental wellbeing at sea with support from IMarEST. There were some 75 major organisation which took place in the event from 25 countries. The second multiplier event was to seek the accreditors from a major engineering institution with Royal Charter and recognised internationally (IMarEST) to review the course content and its platform and see if it would be possible to seek recognition for it. The third and final event in the UK was to gain the support of major maritime organisations such as Lloyd’s Register, Chamber of Shipping, BIMCO who run similar programmes so that to help future collaborations in the post funding phase of the project.

The image shows a Zoom meeting slide with the following content:

Workshop on Mental Health and Bullying at Sea

- **Date and Time:** 8 June 2022 @ 6pm-8pm London Time

Agenda

- **Presentations:** 18:00 – 19:00 Seafarer Mental Health and Well Being
- **Panel Discussions:** 19:00 – 20:00 Mental Health and Bullying at Sea

Speakers:

- 18:00-18:10 **Professor Reza Ziarati**, Centre for Factories of the Future – Research Methodology
- 18:10-18:20 **Professor Mariusz Dramski**, Maritime University of Szczecin, Szczecin – PROMETHEAS Project
- 18:20-18:40 **Katerina Georganta**, IDEC – Course Content
- 18:40-18:50 **Captain Heikki Koivisto**, Satakunta University of Applied Sciences – Sample Interviews
- 18:50-19:00 **Professor German de Melo Rodríguez**, Technical University of Catalunya – IMO/ILO Efforts

On the right side of the slide, there is a video call interface with several participants. The top participant is labeled 'C4FF' and 'Dr. Laura...'. Below them are 'Thomas', 'Heikki Koivisto', 'Dr. Berro Celis', and 'Dr. Berro Celis'. In the center of the slide, there is a graphic with the text 'MENTAL HEALTH MATTER' in large, bold, black letters on a grey background.



Zoom Meeting

Participants (11)

Organisational Causes Affecting Mental Health Shipping companies vs Administration vs IMO vs ILO

- **Health and safety policies that are missing or inadequate** – Leading to stress and other health and safety issues on board as opportunities are not in place to identify and manage them appropriately
- **Poor communication** – Resulting in confusion and not knowing what to do and feeling that the crew is not supported
- **Poor management practices** - Failing to explain roles and responsibilities, unclear reporting lines, failure to provide sufficient resources and failure to manage crew effectively
- **Inflexible working hours** and long stints which do not support seafarers in managing work/life balance
- **Giving seafarers tasks which are unsuitable for their competencies** or insufficient training or knowledge and type of support provided with tasks which may lead to non-achievement of objectives
- **High or unrelenting workloads** which mean seafarers do not have time to complete tasks
- **Unfair distribution of group work** where one or more persons are not doing their job properly and others have to compensate for them
- **Lack of procedures to deal with bullying** or psychological harassment



Co-funded by the Erasmus+ Programme of the European Union

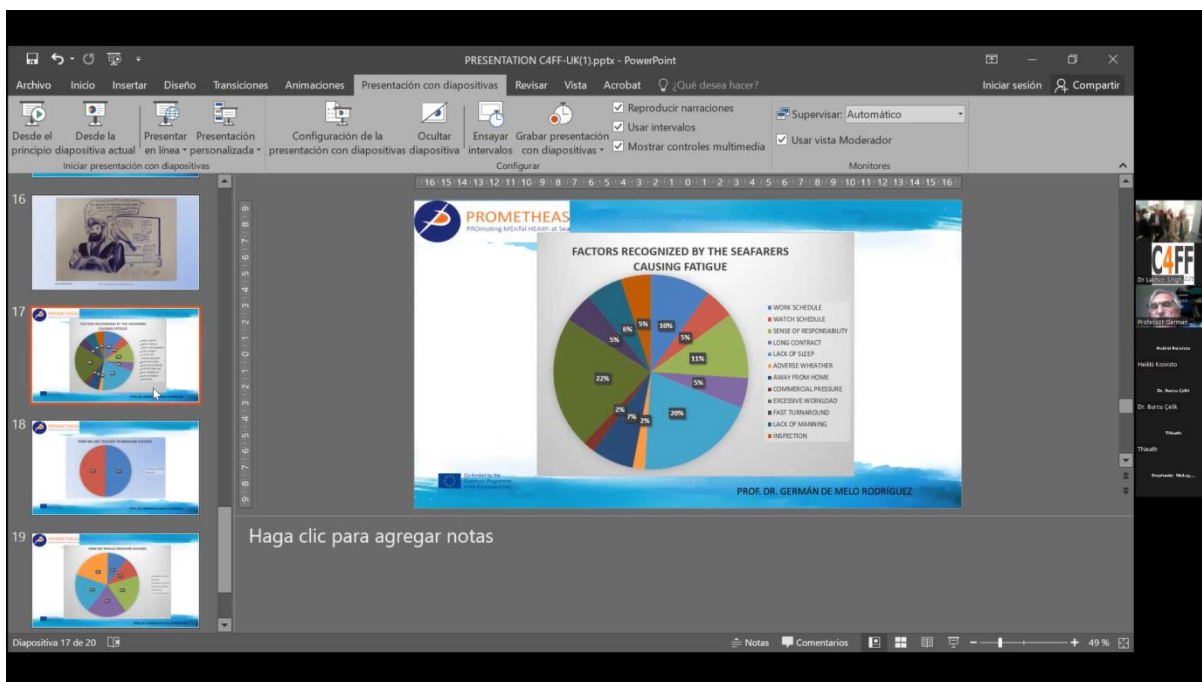


- Systemic problem
- Participatory approaches
- Collective effort
- Training, awareness and investment on mental health on board with an organizational (not individual) point of view
- Training leaders
- Positive Psychology
- Suggestions for the target, the perpetrator, other crew members, supervisors, contact persons, the organization (owners and HR departments)
- Evaluation



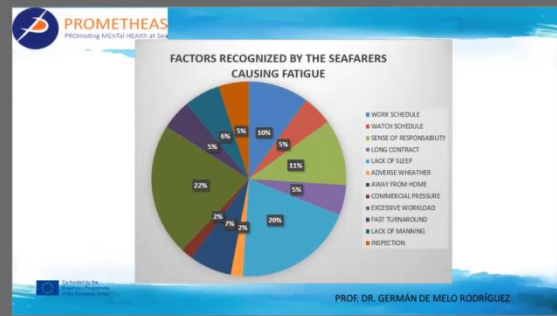
Minna Kahala interviewed

Ms Minna Kahala, senior lecturer, MSc (Health), Psychiatric nurse interviewed three experts by experiences



PRESENTATION C4FF-UK(1).pptx - PowerPoint

- Archivo Inicio Insertar Diseño Transiciones Animaciones Presentación con diapositivas Revisar Vista Acrobat ¿Qué desea hacer?
- Reproducir narraciones
- Usar intervalos
- Mostrar controles multimedia
- Supervisar: Automático
- Usar vista Moderador



Haga clic para agregar notas



Photos of UK second and third Multiplier events.

Life Skills VR Project

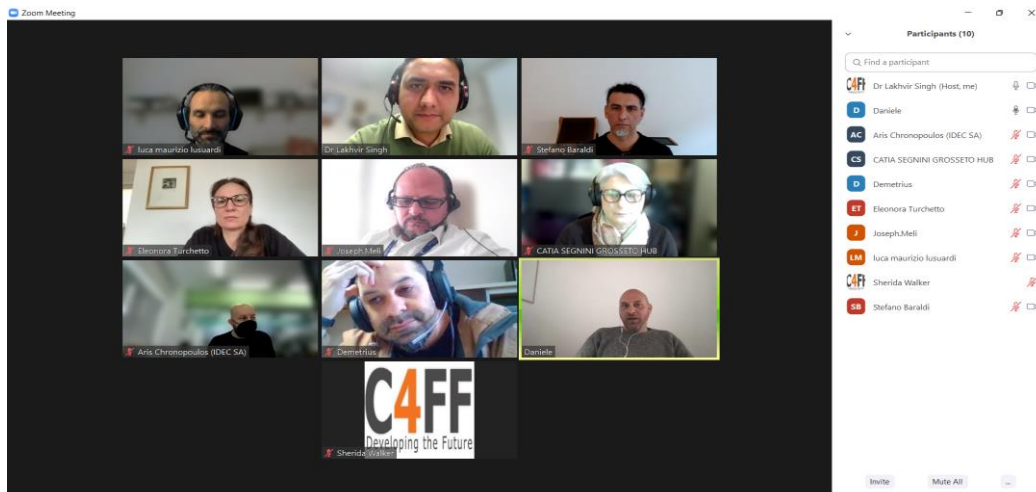
VR Innovation Project - Life Skills for Employment in COVID-19 Era Through VR Innovation Project - Another revolutionary idea from C4FF

Although this project proposal is about Life skills development helping young and old find worthwhile jobs, VR offers a range of solutions in several other areas.

Our proposed project aims to solve the problem of giving youth the necessary skills and knowledge of what their skills and abilities are and in which occupation they can excel in and have a bright future. By approaching the issue at the earliest stage, the aim is to prepare the young and to reduce stress and future dissatisfaction and provide a glance of future opportunities. The users will be able to recognise missing skills and thus focus on the important aspects by themselves and therefore will be able to eliminate skills mismatching and develop key skills. Also, by knowing their strong points, the Generation C will be able to develop themselves to higher levels in seeking and retaining good and well-paid jobs.

The VR proposed solution will have many more applications providing 3D visualisation of technical or non-technical information for learning new situations, acquiring new skills or simply helping us to navigate a new location or perform our jobs better. It can be used as a ship or boat simulator or navigation system. The proposed system can also capture information for analysis later and so forth. The combination of smart phones and VR technology can revolutionise the way we live and learn. What about using the VR devices for detecting dangers on our path for those with visual impairment or having access to information at meetings?

The project could support some of the work initiated by C4FF to help design new AI software to develop new VR applications. With C4FF's track record of developing novel AI solutions there is an expectation that a number of disruptive products and services will be introduced in the application of computer technology in our daily jobs and lives.



Life Skills VR Project Partner Meeting

The next face-to-face partner meeting will be held in Portugal in March 2023. For more information, please visit the project website: <https://lifeskillsvr.com/>