26th ERVO Annual Meeting
10th – 13th June 2024
Vigo, Spain

The 26th European Research Vessels Operators (ERVO) Annual Meeting was held from the 10th to 13th June 2024 in Vigo (Spain) and was kindly hosted by *Unidad de Tecnología Marina (UTM)* and *Consejo Superior de Investigaciones Científicas (CSIC)*.

Tuesday 11th of June 2024		
8:30	**ERVO Annual Meeting registration - Posters installation**	
8:55	**Practical arrangements of Day 1** Welcome introduction from hosts.	*J. Dañobeitia / J. Sorribas*
9:00	**Opening 26th ERVO and Round Table** Individual introductions	*R. Codiglia / All*
9:10	**Introduction 26th ERVO meeting [PDF]** As ERVO Executive Committee (ExCom) Chair, Riccardo Codiglia provided an overview of ERVO for new participants / attendees, including key achievements, overview of the ExCom, increasing participant numbers, EMB Position Paper 25 (European Research Vessels – Current Status and Foreseeable Evolution), webinars. Riccardo Codiglia then completed the formal handover to the new ERVO ExCom Chair, Aodhán Fitzgerald, with James Parker becoming ERVO Executive Committee ExCom Vice Chair.	*R. Codiglia*
9:15	**Review and approval of ERVO 2023 minutes [PDF]** J. Sorribas supported acceptance of the 2023 Meeting Minutes, and there were no objections to the minutes being accepted.	*A. Fitzgerald*
9.20	**Eurofleets AISBL Phase 1: Presentation of Mission, budget, and statutes. Request for feedback [PDF]** Aodhán provided an update on Eurofleets project lifecycle, from Eurofleets in 2009 to the current Eurofleets AISBL project.	*A. Fitzgerald*

Theme 1: Delegates Reports of Activity

9:30	**Managing an aging ship: The past, present, and future of RV Cefas Endeavour [PDF]** James Provided an overview of RV Cefas Endeavour, covering the last 20 years of operations, current activity, and possible future activity relating to planned end-of-life of RV Cefas Endeavour. Ongoing UK Government pre-election period limited the detail which could be shared regarding future activity.	*J. Parker*
9:50	**Experiences from testing and operating RV GAIA BLU - innovative management and new scientific discoveries [PDF]** Lorenza provided an overview of the transition from RV Falkor to RV Gaia Blu. *There was then a small discussion at the end of this presentation regarding the certification requirements for scientists on RVs, and*	*L. Evangelista*

	how this could be standardised. The result of this was that interested parties may create and distribute an electronic survey for completion by attendees to better understand how this approached internationally.	
10:05	**RV Laura Bassi's latest Antarctic expedition [PDF]** Riccardo provided an overview of RV Laura Bassi and the new installations onboard, including upgrades to their 'Baltic Room', improved Coring and Bottom Sampling capability, equipment for Polar Code compliance, and improved satellite communications connectivity.	*R. Codiglia*
10:20	**Coffee break & national update posters**	
Theme 2: RV builds, Modifications and performance		
10.45	**The future 'NSH' (mid-shore ship) of the French Oceanographic Fleet [PDF]** Victor presented about Ifremer's mid-shore research vessel, Navire Semi-Huuturier (NSH), which will be named after the first female researcher in France. Design, technical specification, challenges (bubble sweep, battery management,	*V. Martin*
11:00	**Revamping the ICT infrastructure of r/v Laura Bassi [PDF]** Massimiliano presented about the issues, associated solutions, the outcomes/results, and future plans.	*M. Iurcev*
11:15	**Design and construction of MBARI´s new research vessel *David Packard* [PDF]** Will (Glosten) provided an overview of the build process underpinning MBARI's RV David Packard, including the timeline of activities, the functions of the ship, and configuration of the RV work spaces. Santiago (Freire) presented an overview of Freire shipyard and how the build process was managed with Gloston. Isabel (Glosten) summaries the 3-year build activity, including build, launch, outfitting, and sea trials.	*W. Moon / I. Goñi*
11:30	**New RV for Northern Ireland [PDF]** Hans (Skipsteknisk) presented about the procurement of the replacement for RV Corystes, which benefits from the experience of RV Tom Crean, whilst highlighting the key difference in the propulsion system and the utilisation of a hybrid power supply with 1600kWh of battery capacity for peak shaving, etc.	*H. Ove Holmoy*
11:45	**Update on the New Dutch Research Fleet [PDF]**	*Z. Erdem*

	Zeynep presented about the replacement of the Dutch research fleet, with an summary of the new Dutch vessels RV Adriaen Coenen (in service since Aug 2022), RV Wim Wolff (delivered 11 Jun 2024 – the day of the presentation), and RV Anna Weber-van Bosse, with the additional utilization of new autonomous equipment. RV Wim Wolff emissions will use HVO and be neutral by 2031. RV Anna Weber-van Bosse will be methanol ready with the aim of zero emissions after a 10-year refit.	
12:00	**Winch and controls specific features for subsea research working [PDF]** An overview of Ferri's work supporting research vessels was provided, including the problems identified in the procurement of systems (e.g. misspecification of systems), and possible solutions to resolve these (e.g. collaboration to establish requirements before system design.	*Ferri*
12:15	**Best practices for installing acoustic equipment to minimize noise on RV's [PDF]** Leif provided an overview on the types of noise impacting research vessels, including hydrodynamic noise (bubbles sweep down, etc.) and mechanisms of reducing these issues (e.g. hull design).	*L. Kanschat*
12:30	**A decade of success in Ocean Exploration using a modern Spanish research oceanographic fleet [PDF]** Jordi presented an overview of the CSIC fleet, highlighting retired vessels and new vessels entering the fleet. Jordi also summarized the strategic plan for the Spanish research fleet and associated land facilities, and an overview of the fleet activity (temporal and spatial), scientific disciplines, and the users.	*J. Sorribas*
12.45	**RV Kaharoa II [PDF]** Greg provided a summary of the build process at Armon. Greg highlighted that RV Kaharoa II is a much more scientifically capable vessel with a hydrographic capability through hull blister, summarised the technical specifications of the new build, and the key learnings from the process.	*G. Foothead*
13:00	**Lunch + Group Picture**	
14:00	**Kongsberg EM2042: Improving integrations and use of multibeam echo sounders on research vessels [PDF]** Jose presented the new Kongsberg MBES for shallow water mapping, highlighting its features, differences from the predecessor (EM2040), and the upgrade path from EM2040. Example outputs from the EM2042 were also shown.	*J.M. Cordero*
14:15	**Sustainable Fishery with new compact Handling Technology [PDF]**	*T. Ringstad*

	Torkjell provided a summary of Evotec, including its range of products and how system integration is achieved and applied to the various sectors specific to the ERVO community. A new trawl solution was also presented which reduces manual handing and improves welfare of animals.	
14: 30	**Owner / operators perspective on AFBI's new ship design development [PDF]** Phil presented an overview of the design considerations relating to the design of a bespoke research vessel design, including use of proven technology, futureproofing (incl. supporting shore infrastructure – e.g. shore power and connectivity). Phil highlighted the budget drivers and project risk management measures, including extended yard warranty, contract mechanisms, financial sustainability, environmental sustainability, and being commercially attractive.	*P. Jeffares*
Theme 3: Manning, Safety and Training		
14:45	**P&O Maritime approach to safety management [PDF]** Barry presented an overview of P&O Maritime, values around safety, and how the research community (and the work involved) pushes technology and creates new technical, operational and safety challenges. Barry went on to present about solutions to such challenges, including seeking out information, effective communication, and knowing involved stakeholders.	*B. Kavanagh*
Theme 4: Cooperation, Communications and Outreach.		
15:00	**United Nations Biodiversity of Areas Beyond National Jurisdiction Treaty or BBNJ Treaty – impacts for RV operators [PDF]** Ella presented about the "Treaty of the High Seas", including what it is, what the objectives of the treaty are, and the timeline for implementation. Ella then presented the NOC and UK Foreign Office view on how to implement additional steps to ensure compliance. Ella also highlighted the activities not being undertaken by them as a vessel operator (where responsibility will lie elsewhere).	*E. Darlington*
15:15	**Holland One to Holland. An example of successful interoperability [PDF]** Aodhán provided an overview of the project involving Marine Institute's ROV Hollan I and its application on a project on RV Pelagia with NIOZ where the system was used to support the recovery of subsea scientific infrastructure. Aodhán summarised the infrastructure required to support the operation, including deck housing, power provision, etc, and highlighted the challengers which needed to be overcome.	*A. Fitzgerald*

15.30	**"Euro RVTEC" Co-operation between European RV Techs [PDF]** Manuel provided a brief overview of UTM-CSIC, the view of the engineers / technicians about survey activity and preferences in job satisfaction. Proposal for consideration of Euro-RVTech as there is not a technician network, with problems of current situation highlighted, and benefits of change highlighted (e.g. sharing equipment, collective problem solving, shared manuals and workshops, shared training opportunities, etc.)	*M. Paredes*
15:45	**Protocols and procedures against harassment onboard the Spanish RV fleet [PDF]** Neus presented about the *CSIC Equality Plan* and *Prevention and Intervention protocol against sexual and sex-based harassment*, action protocol against workplace harassment, steps of introduction and implementation (incl. consultation), consideration for research vessel environments and the nuances of such areas (e.g. diversity of participants, variable crew, occupancy, and space utilization/allocation).	*N. Roma*
16:00	**Coffee break & national update posters**	
16.20	**Polarin Update [PDF]** Aodhán presented about the Polarin project which is led by AWI and aims to provide efficient and customised Research Infrastructure (RI) services to address the scientific challenges of the polar regions, including access to a wide portfolio of complementary and interdisciplinary top level RIs which include Research vessel and Icebreakers	*A. Fitzgerald*
16:35	**AQUARIUS Update [PDF]** Rosemarie presented about Aqua Research Infrastructure Services, its participants, objectives, the thematic and geographical scopes, work packages and associated lead institutes, approaches for trans-national access, and provision of technical training.	*R. Butler*
16.50	**IRSO UPDATE [PDF]** Greg provided an overview of the upcoming IRSO Forum in Vancouver (Canada), including a request for indication on attendance, request for presentations, and asking whether invitation from hosts are required to support attendance (for visa applications). Greg also highlighted there is a workshop on the first afternoon addressing wellbeing.	*G. Foothead*
17:00	**End Day 1**	

Wednesday 12th of June 2024		
9:00	**Opening and practical arrangements of Day 2**	*A. Fitzgerald / J. Dañobeitia*

Theme 5: Support & Operations to Ocean Observing System. Remote Operations & underwater Vehicles

9:05	**Enabling multi-robot collaboration by integrating the Sonardyne Mini Ranger 2 system with the Robotic Operating System [PDF]** Duncan presented about the Sonardyne Ranger beacon and its applications. Duncan also highlighted the Ocean Exploration Cooperative Institute (OECI) Technology Integration Cruise, the range of surface and sub-surface platforms used, their collaboration and integration, and the application of Sonardyne beacons/modems to deliver project outcomes.	*D. Rigg*
9:20	**Remote Enablement - The Future of Marine Research (Live demonstration) [PDF]** Jimmy Dean spoke about the challenges of working in the offshore marine environment, and the ability to make real-time decisions to support such challenges. Jimmy presented the Nodestream Protocol solution developed by Harvest Technology and an example user case, the development of new technologies (including wearables, mobile device enablement and software integration), remote support provision, remote monitoring, . A live demonstration was then given, including linking live to RV Celtic Explorer.	*Harvest Technology Group / Voyager IP*

Theme 6: Energy Efficiency, alternative energy sources & zero impact

9:45	**Technologies for the research vessel of tomorrow [PDF]** Trond presented about the main factors for changes in maritime (e.g. regulations), Kongsberg involvement in the technologies for sustainability and efficiency (e.g. permanent magnet technology on thrusters, AUV and associated launch and recovery systems), Reach Subsea systems, and digitalization and remote support).	*T. Arvid*
10.00	**Over the horizon and under ice, advances in MAS from NOC [PDF]** Maaten presented about the range of platforms developed and/or operated by the National Oceanography Centre (NOC, UK), recent Autosub Long Range (ALR) missions and lessons learned from project challenges, and the current Biocarbon programme which is happening now.	*M. Furlong*
10:20	Coffee break & national update posters	

Theme 7: Shipbuilding innovation and sustainability

11:00	**Replacing steel wire for coring and CTU with fiber solutions – Lightweight, strong and durable [PDF]** Davíð presented about the range of locations and industries Hampiðjan work in, with winch ropes supporting the fishing industry. The benefits over steel wire were presented, and the range of applications including trawling, CTD, and the embedded coax and developing fibre-optic capability.	*D. Waage / Hampiðjan Advant*
11:15	**Vigo as a high-performance Hub in the construction of Research Vessels. Current status, opportunities and future perspectives for 21st century research vessel [PDF]** Juanjo presented about Vigo's capability and capacity to support the marine industry, with significant employment in shipbuilding and shipping. The evolution of the Vigo shipbuilding industry (for research vessels) was presented with the number of new builds increasing to 12 per 5-year period in recent years, the new concepts in RV design and construction, and innovation. Finally, TBC highlighted the socio-economic benefits of ocean observation, and why collaboration is needed.	*J. Dañobeitia*
11:30	**Implementation of alternative fuels and decarbonisation technologies in Research Vessels. From requirements definition to ship delivery [PDF]** Oscar provided an overview of Seaplace, and moved on to present decarbonisation pathways, fuel storage requirements, alternative power generation (e.g. fuel cells) and associated storage requirements. An example was then provided of the implications of switching from MGO to methanol, and the incorporation of CO_2 capture and storage.	*O. Perez*
11:45	**ICES working group on greening the fleet. Results and update [PDF]** Christian (Co-Chair of ICES WGGRF) presented an overview of the working group (incl. Terms of Reference), how it feeds into the ICES Science Plan, the first results (incl. baseline data, stakeholder survey outputs), regulatory developments, refit and newbuilding drivers and challenges, the associated activity in the merchant shipping sector and its implementation of energy efficient technology. Christian finished by highlighting the outlook for the ICES WGGRF and intentions to present some further outputs at IRSO.	*C. Freudinger*
12.00	**Hybrid and 100% Electric Propulsion Systems for Oceanographic Vessels [PDF]** Adriana presented an overview of Transfluid Industrial and Marine	*A. Navarro*

	and experience of green solutions in the marine sector. Adriana moved on to highlight why hybrid solutions are beneficial, and presented a success story (Oceanographic Vessel Universidad de Vigo).	
12:15	**Business cooperation to boost innovation in shipbuilding [PDF]** Enrique presented a summary of Asime (which represents metal industry and associated technologies companies), their areas of specialisation, and key projects they are or have been involved in.	*E. Mallón*
12:30	**Lunch + Coffee**	
Special Session Shipyards / Shipowners /Operators. Round Table		
13:30-16:00	**New Perspectives and opportunities for marine research using new modern multipurpose oceanographic research vessels.** The purpose of this section is to establish solid links between industry, such as shipyards, technology equipment and sensor providers, ship operators, research scientists, in order to create synergies for the benefit of marine research within the framework of the decade of the oceans. Each speaker invited will give a short talk introduction of 7 minutes, then we will establish a dialogue between the round table and the speakers.	Moderator: *Juanjo Dañobeitia, UTM-CSIC, Spain*
	Zero-emission technology for RVs of the future and perspectives [PDF] Santiago presented a range of research vessels which have embraced a range of fuels, and steps that can be taken to optimise operations (e.g. engine size and power requirements, speed expectations), and considerations for fuel selection (including geographical operational ambitions, consequential impacts, etc.).	*Santiago Martín, Armon Shipyard, Spain*.
	Augmenting research vessels with advanced sensor and platform solutions – advantages and challenges [PDF] Peer presented about the range of products Kongsberg can offer to research vessels, the change in marine use and impacts over the last 500 years, the purpose of research and ocean observing, technological developments to support ocean observations, and the advantages and challenges present.	*Peer Fietzek, Kongsberg Discovery, Germany.*
	Considerations for new multi-purpose research Vessels? [PDF] Aodhán provided a summary of the build process associated with RV Tom Crean, including what has worked well in the design and build process, and key features enabling success. Aodhán also presented about the emerging challenges in the marine environment (including autonomous vehicle operations, data transfer), and design / build considerations for the future.	*Aodhán Fitzgerald, Marine Institute, Ireland.*

	Near shore marine research with low emission medium size vessels [PDF] Daniel spoke about the role of small / medium sized vessels, an example of successful partnership, and implications for CIM.	*Daniel Rey CIM, Spain.*
	Regional Research Vessels challenges in construction (capacity, dimensions, consumptions, etc.) to support UN decade of the oceans [PDF] Jordi spoke of the challenges in accommodating the scientific requirements of the users when designing and building regional and local research vessels. Jordi finished by presenting a number of challenges for the audience to consider and contribute responses to in the roundtable discussion.	*Jordi Sorribas CSIC-UTM, Spain.*
	Impact on the design of new deep-sea research vessels considering the new sustainable requirements and technologies [PDF] Luis spoke of alternative fuels available to support decarbonisation and the implications for arrangements, space distributions, location of scientific equipment (e.g. MBES).. Luis also spoke of the considerations around technological maturity, crew capabilities, spares availability, fuel availability and logistics, communications and cybersecurity.	*Luis Santos Freire Shipyard, Spain*
	Towards and Alliance of European Research Fleet: sharing knowledge and assets. Unable to attend.	*Giuseppe Magnífico, CNR, Italy*
	Discussion: • Armon highlighted the belief that crew numbers could be reduced in the future through automation, and that they feel that a large deck space which is interoperable is a key requirement, and the space created through such a deck helps accommodate decarbonising fuels below decks. • The moderator posed the question about the difference between research and monitoring and whether this stimulates different approaches to things such as automation. Peer agreed that there is likely to be an impact on the approach, however better determination between what research and monitoring will be a key first step (i.e. should research funding be used for sustained monitoring). Jordi highlighted that data outputs also include physical samples collected from the marine environment and not just digital products. • The audience posed a question as to whether the extent of the fuel decarbonisation approach is an isolated solution, or whether the source and production of raw materials to build vessels should also be considered (e.g. green steel). The panel highlighted that this will be dependent upon the technology and sources available, and consideration also needs to be given to the sources of power supporting the vessel construction industry. The panel also highlighted that batteries do not offer a zero-emission solution when	

	considering the embedded carbon associated with production and disposal. • The moderator posed a question to the panel regarding the sharing of equipment (e.g. RV Holland 1). The panel's view is that there needs to be a wider consideration of the global fleet and their location to remove avoidable transits. The panel also proposed considering the hotel load (whilst alongside) and whether this may be a reduction ambition to reduce the amount of fuel consumed where no work is being undertaken. In response, frequency drives were proposed, however these come with issues during operations, etc., along with the provision of shore power. Another proposal from the audience was that digitisation of the ship (active response to presence, etc.) is possible, but solutions come at a cost, and in a competitive tender process yards will look to maximise success for yards. Suggestion therefore is early engagement with yards is key to ensure that key requirements and considerations are discussed and factored into the design. The audience acknowledged this and highlighted that this is why industry is invited to ERVO meetings, and suggestions are that more presentations (e.g. lessons learned) would be beneficial to the ERVO community. • The audience posed a question as to whether a generic design for a regional vessel / ocean vessel would be beneficial. The panel's view was that there would be some commercial competitiveness in this space (i.e. who would design such vessels), however successes have been achieved through close collaborations between CSIC and Armon. The panel also highlighted that it can be sometimes difficult to determine and agree the scientific requirements which are to be delivered by the vessel. • The audience commented that shutting down critical systems (which are deemed unacceptable) are challenged (e.g. servers, etc.). It was also mentioned whether the collaboration piece has been pushed hard enough, and whether more can be done through use of technology (e.g. MFP, etc.). Greg highlighted that the maintenance of their new vessel may become challenging (whilst accommodating a lot of kit in a small space), which may incur higher costs, etc. The audience referred back to the battery discussion and the emissions associated with build and disposal, and the need to consider the carbon footprint associated with the build and disposal of research vessels – there was broad agreement with this statement.	
16:00-16:20	**Topics, date & place ERVO 2025** Aodhán announced to the attendees that the 27th ERVO will be hosted in Torshavn, Faroe Islands, with dates to be confirmed in the coming weeks/months. Jordi thanked everyone for coming, the organising team, and the sponsors. Aodhán thanked Sandra from EurOcean for their ongoing support, and then officially closed the meeting.	*A. Fitzgerald / J. Sorribas*
16:30-19:00	**Guided Visit to RV Oden de Buen**	*Armon Shipyard*