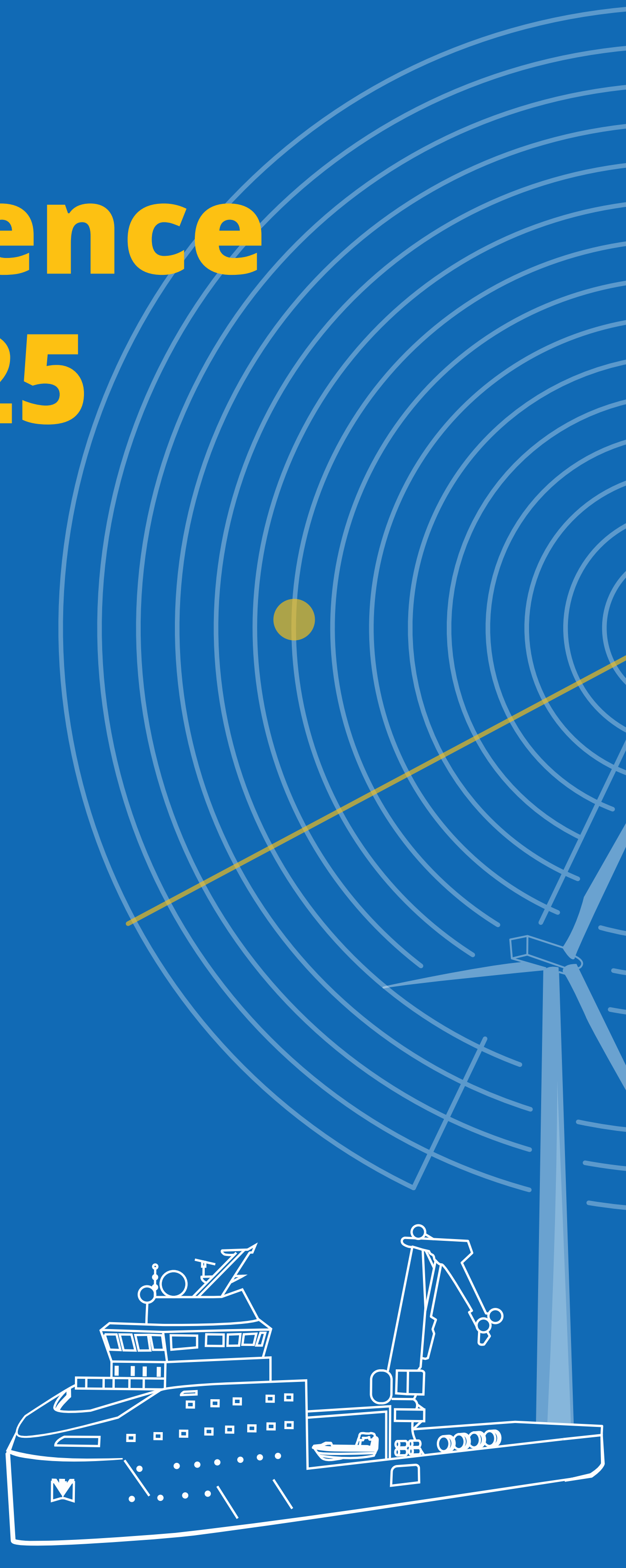
DP Conference Report 2025

3-4 June 2025

Istanbul



The International Marine Contractors Association (IMCA) is the international trade association representing offshore marine contractors, service companies, and the industry's supply chain

IMCA's mission is to improve performance in the marine contracting industry. To achieve this, we leverage the expertise of our Members through our conferences, seminars, and network of committees.

IMCA's third DP Conference was held in Istanbul, Türkiye, on 03-05 June 2025.

The 2025 Conference was aimed at those involved in offshore renewable energy and offshore oil and gas dynamic positioning (DP) operations with a focus on greenhouse gas emissions and vessel efficiencies

The event provided an opportunity for more than 140 IMCA Members and industry colleagues to participate in a collaborative industry forum. Not only did attendees hear from experts actively involved in dynamic positioning, but they also had the opportunity to participate in Q&A sessions and workshops, the outputs of which helped formulate the work programme for IMCA's DP Committee.

Keynote

Hulya Ozgur, Business Unit Director at Subsea7

The keynote of the IMCA DP Conference 2025 was delivered by Hulya Ozgur, Business Unit Director at Subsea7. Speaking from a unique operational and leadership perspective, Hulya reflected on the critical role of dynamic positioning in complex subsea operations and its evolving alignment with environmental and commercial pressures. Her address blended personal insight with organisational learning, setting the tone for a conference focused on responsibility, innovation, and leadership.

Key themes

DP as enabler of decarbonisation: Hulya underscored DP not simply as a technical function but as a key operational lever to reduce emissions and improve project outcomes. She stated that fuel consumption for DP vessels can reach up to 20 tonnes per day, urging the industry to rethink 'how' and 'why' DP is used in the context of climate targets.

Türkiye operations – Sakarya Field: Reflecting on Subsea7's recent work on the Sakarya Gas Field, Hulya described how DP-supported construction and umbilical installation helped complete critical gas infrastructure in record time. The operations, she noted, were completed safely and successfully even in the wake of the Turkish earthquakes.

Closed bus operation: A strong call was made to take closed bus tie (CBT) 'off the slide deck' and onto vessels. Hulya challenged industry stakeholders to stop debating and start proving safety cases through testing, trials, and learning-by-doing. She called CBT a 'first and practical' step in emissions reduction for DP vessels.

Human factors and local capacity: Hulya acknowledged Türkiye's growing DP competence base: crew, shipyards, and regulatory structures. She stressed the value of empowering local teams with both equipment and knowledge.

Leadership and culture: Throughout the address, Hulya wove a theme of professional curiosity and organisational courage. She challenged the audience to 'set the standard' rather than wait for others to define it, stating that the next era of DP must be defined by proactivity, not inertia.

Closing remarks

Hulya's parting message was both motivational and directive: "Leadership is not holding position – it's having the courage to move forward." She urged delegates to align DP operations with emissions goals without compromising safety or commercial viability. The keynote was met with strong engagement and positioned the two-day conference as an opportunity to define the future of dynamic positioning together.

IMCA DP Conference 2025 – Session Reports

1 Session 1: Chair's Welcome and Strategic Address

Speaker: Graeme Lorenson, Chair, IMCA DP Committee / Subsea 7

Graeme Lorenson opened the technical side of the conference by acknowledging the significant attendance and growing relevance of the IMCA DP Committee. Reflecting on his own journey – from hands-on roles to now Technical Authority at Subsea 7 – he highlighted how vital collaboration and mentorship are in advancing DP practices.

Graeme introduced the 2025 conference theme, centred around operational pragmatism in the face of increased emissions scrutiny, new technical possibilities, and the persistent challenge of balancing safety with innovation. Referencing the new IMCA guidance on DP1 operations (inspired by 2024 IMCA DP Conference feedback), and updated documents such as M117, M140, and M220, he emphasised the Committee's responsiveness to industry input.

A major focus was on succession within the committee. Joey Fisher (M3 Marine) replaced Harry Verhoeven as Vice Chair, and new members representing OEMs, assurance bodies, drilling contractors, and Brazilian fleet operators (CBO) joined, reflecting a more diverse and future-oriented group.

Graeme closed his remarks by posing difficult questions:

- Are we too risk-averse?
- Are we misusing closed bus and TAM configurations?
- How will greenhouse gas (GHG) reporting shape our choices?

He encouraged attendees to be vocal: ***"We're a small industry. If you don't speak up here, where else will you?"***

He ended with a quote from Napoleon Hill: ***"Every adversity carries with it the seed of an equal or greater benefit."***

2 Session 1: DP Event Reporting – Trends and Lessons Learned

Speaker: Jennifer Evans, Technical Adviser – IMCA

Jennifer Evans delivered her first IMCA DP Conference address with clarity and assurance, outlining the performance and value of IMCA's DP Event Reporting Scheme. She began by thanking the committee and conference organisers for their support in delivering what she described as a 'privilege' of a presentation. Her core focus was on interpreting the 2024 data and sharing real-world examples to highlight where systems and people either succeeded or failed.

Jennifer explained the structure of DP reporting:

- Incidents (position and/or heading loss),
- Undesired Events (where worst-case failure was reached vessel no longer single fault tolerant)
- Observations.

In 2024, IMCA received 217 submissions. See Table 1 below for a breakdown of DP Events.

Table 1 – Breakdown of DP Events

2024 Event type:	
DP Incidents	59
DP Undesired events	115
DP Observations	43
Total:	**217**

A regional breakdown showed Europe and Africa as major contributors, followed by North and South America. The analysis involved 169 vessels, suggesting modest reporting density and highlighting the need for broader participation. Most reports came from DP2 or DP3 vessels, with mobile offshore units and construction vessels accounting for the majority.

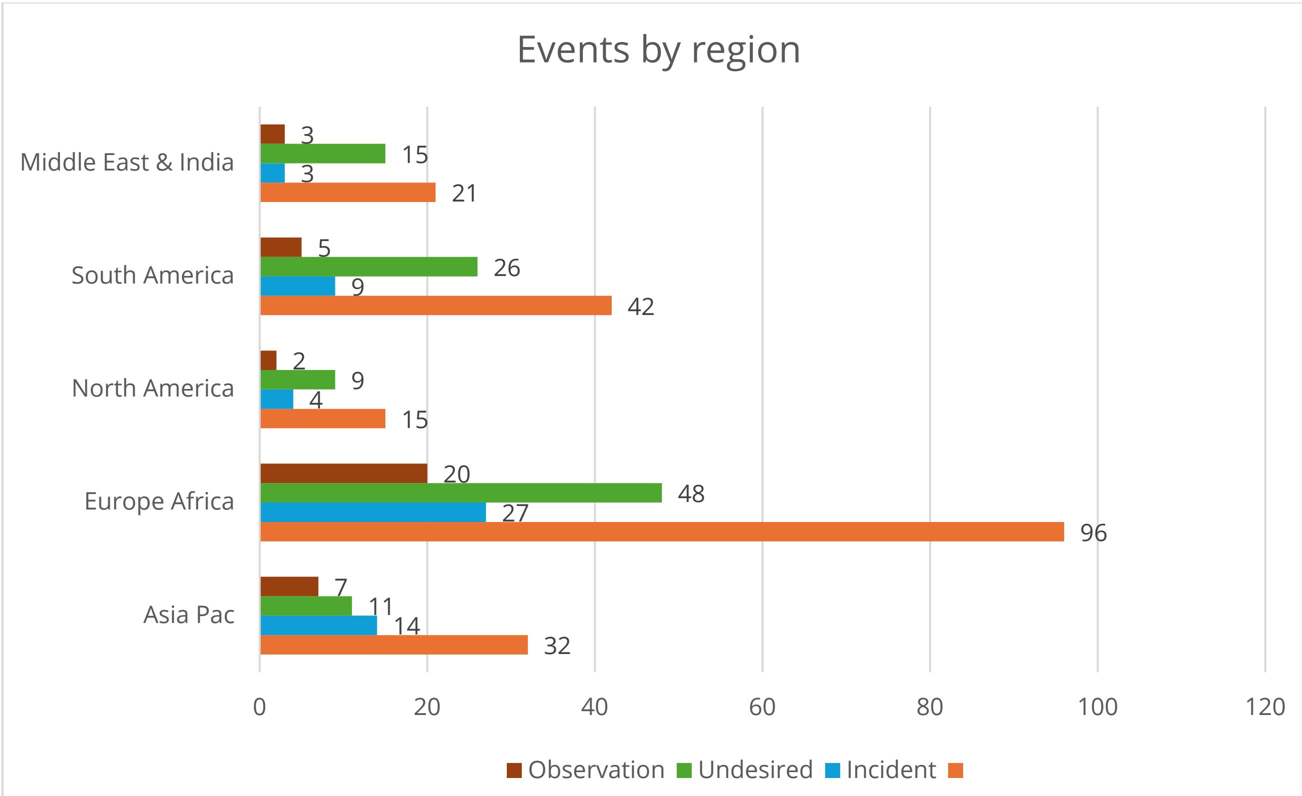


Figure 1 – Events Reported by Region

Jennifer analysed secondary failure causes, categorised as:
- Electrical
- Human
- Mechanical
- Computer

Human factors continued to be the largest contributor to position-loss events while also being involved in more than half of all undesired events.

Jennifer illustrated the human factors problem using a four-part model:

- Sensory (e.g. poor interface layout)

- Memory (e.g. missed checklist steps)

- Decision (e.g. poor judgement)

- Action (e.g. activating the wrong control)

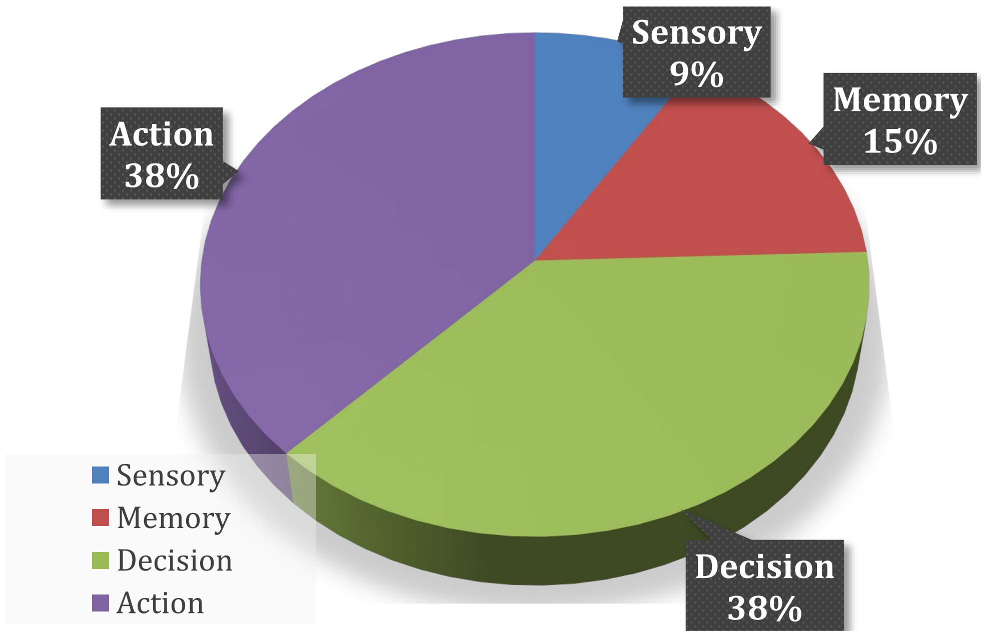


Figure 2 – Breakdown of Human Factors

It was emphasised that clear and concise ASOGs, robust familiarisation training, and formal Continuing Professional Development (CPD) are vital mitigations.

A compelling case study compared two near-identical events, one month apart. The first, logged as an observation, involved a successful fuel filter change under closed bus. The second, under similar conditions, resulted in a blackout and DP undesired event. Both arose from the same procedural gap – insufficient communication and planning. Her message: observations matter. They are often early warnings for future incidents.

Jennifer closed by outlining planned changes to the DP event reporting form, adding fields such as CAM/TAM operational status, field development mode, and other context-enhancing inputs. She encouraged all stakeholders to submit reports and reiterated the scheme's confidential, no-blame ethos. Her final words were a reminder: "Today's observations are tomorrow's incidents – unless we learn."

Figure 3 below represents the percentage of reports submitted since 2015 that have been classed as a DP Incident.

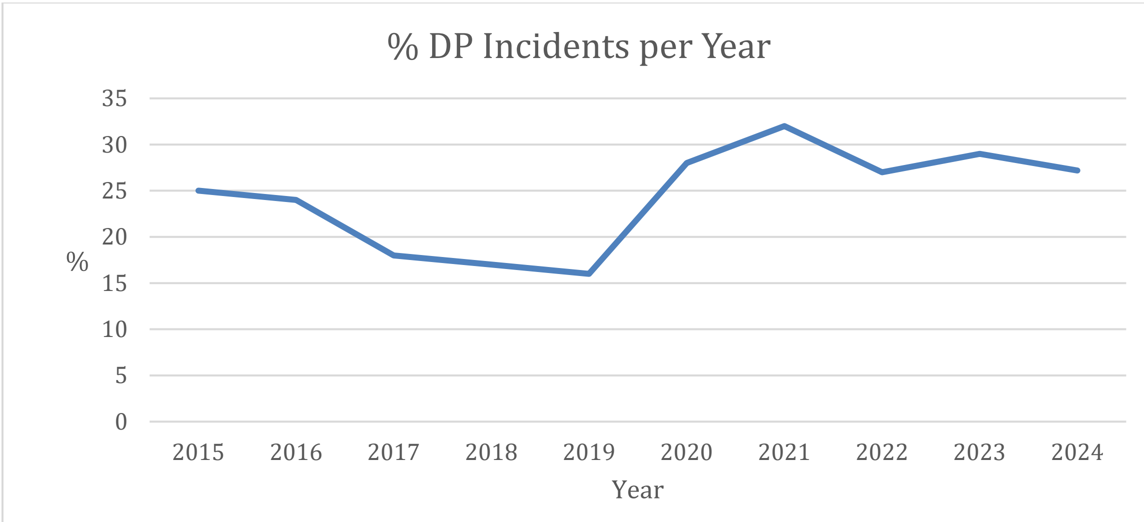


Figure 3 – Percentage of events reported resulting in a loss of position and/or heading

3 Session 1: Capability Plots and the 2025 Update to IMCA M140

Speaker: Luca Pivano, Senior Principal Specialist – DNV

Luca Pivano provided an in-depth briefing on the comprehensive overhaul of IMCA M140, the guidance document used for producing and interpreting DP capability plots. His presentation contextualised the update, outlined the consultation and benchmarking process, and detailed the key improvements made in the new edition, published in January 2025.

Luca began with a historical overview: the original M140 was published in 1992 to standardise DP capability reporting across vessel types and operators. It was revised in 1997, 2000, and 2017, mainly to incorporate new resistance formulas and remove obsolete annexes. However, the structure, logic, and examples remained largely unchanged, until now.

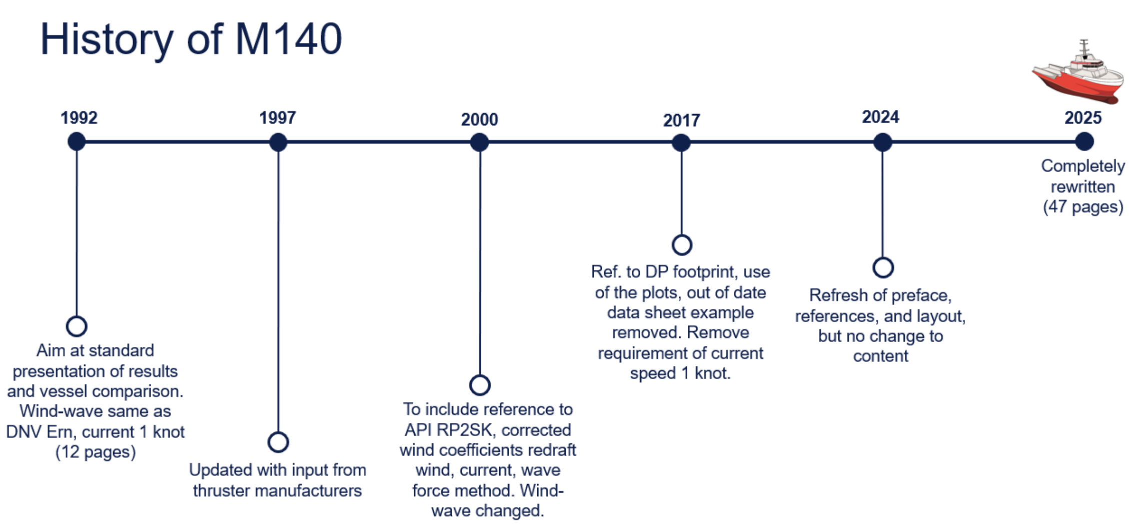
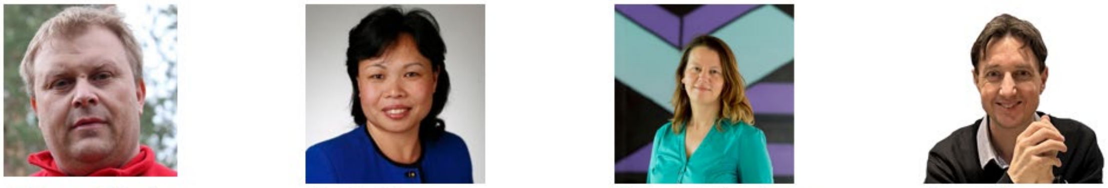


Figure 4 – Timeline of M140

The 2025 edition expands from 12 to 47 pages and was rewritten by a multi-stakeholder workgroup coordinated by IMCA and led by Richard Purser (IMCA) and

Graeme Lorenson (Subsea 7). Contributors included DNV, ABS, AMS Global, TechnipFMC, Tidewater, Solstad, Wärtsilä, and Kongsberg.



Jetmund Sætre, Kongsberg Maritime | Suqin Wang, ABS | Petra Stoltenkamp, Wärtsilä | Luca Pivano, DNV

Figure 5 – M140 Rev.2.0 Key Contributors

Key changes included:

- Clearer definitions and use of standard abbreviations,
- The introduction of ‘static’ vs. ‘dynamic’ analysis methods,
- Detailed guidance on assumptions and load cases,
- Expanded discussion on effective thrust utilisation and how to factor in losses,
- Guidance on failure modes, allocation logic, and thruster degradation,
- Appendices explaining environmental data selection and wind-current relationships.

Luca explained the difference between static and dynamic methods:

- **Static**: No vessel motion assumed, conservative environmental vectors, useful for simple comparisons.
- **Dynamic**: Full simulation of thrust allocation, footprint, environment, and motion. More accurate but requires greater input data and expertise.

The document allows for either method, provided the assumptions and limitations are clearly reported.

One of the most significant new metrics introduced is Effective Thrust Utilisation (ETU). Unlike average utilisation, ETU identifies the critical subsystem or axis driving the system’s true limitations. This has operational implications for consequence analysis, ASOG development, and integration with DP alerting systems.

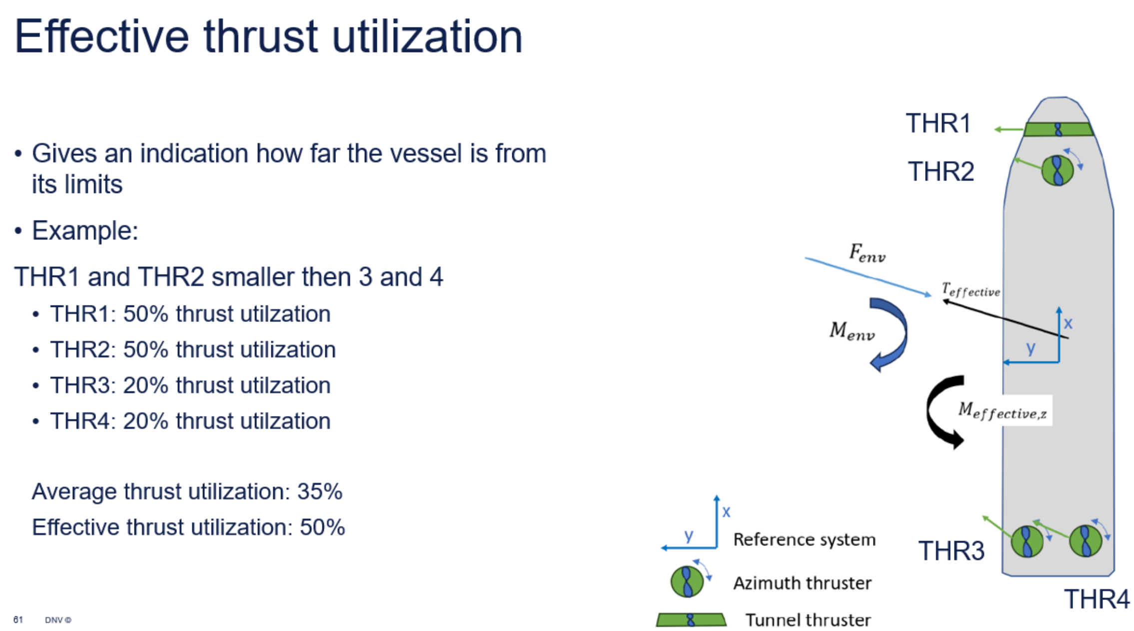


Figure 6 – What's New – Effective thrust utilisation

The revised M140 also aligns more closely with DNV-ST-0111's levels of analysis, especially Level 2-Site and Level 3-Site, creating consistency between IMCA and class expectations:

- IMCA M140 requirements are inline with most of the requirements in DNV-ST-0111 Level 2-site and Level 3-site (current version of DNV-ST-0111),
- The new version of the DNV-ST-0111 will align with IMCA M140 (effective thrust utilisation, requirements for thrust allocation accuracy),
- If you run a Level 2-Site analysis based DNV-ST-0111, you satisfy the IMCA static analysis,
- If you run a Level 3-Site analysis based DNV-ST-0111, you satisfy the IMCA dynamic analysis.

Luca concluded his session by encouraging delegates to view M140 not only as a compliance reference but also as a practical tool for ensuring vessel readiness, mission planning, and equipment awareness: "The guidance is no longer just technical – it's educational."

4 Session 2 – Introduction to Closed Bus – Efficiency Without Compromise

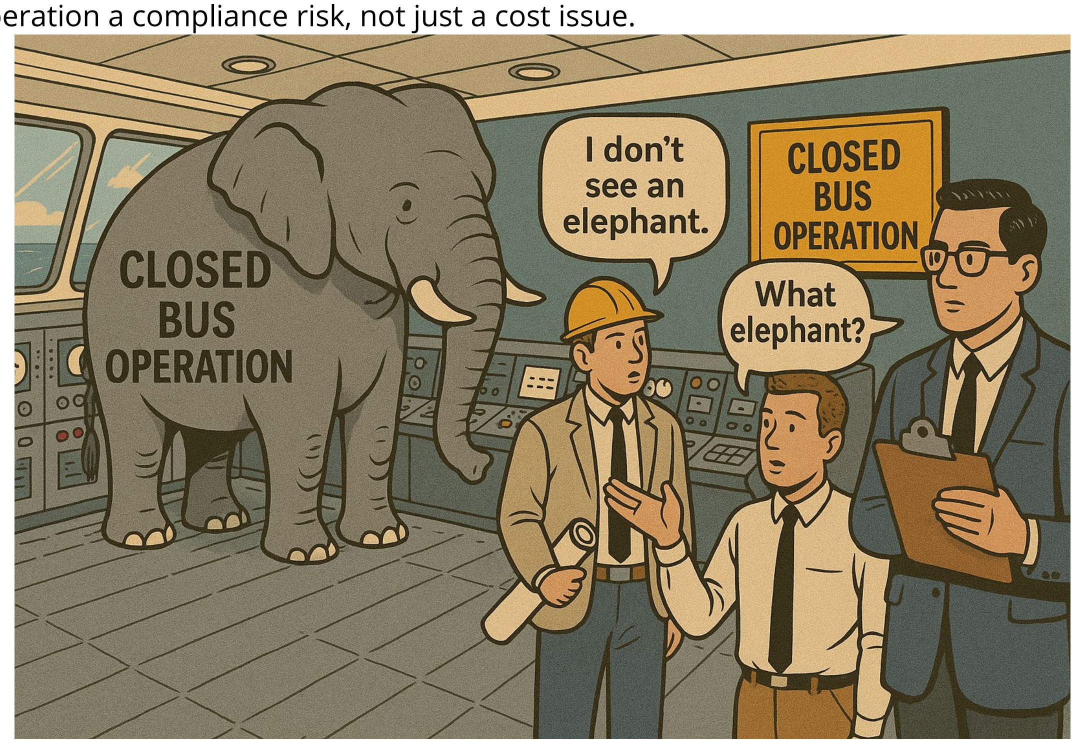
Speaker: Richard Purser, Technical Advisor – IMCA

The opening talk of session 2 addressed the growing industry imperative to enhance fuel efficiency and reduce emissions on DP vessels, in line with evolving IMO regulations, EU carbon schemes, and client-driven decarbonisation targets. The core theme: adopting Closed Bus operation without compromising safety or redundancy.

Key issues highlighted

Traditional DP configurations: Most vessels default to open bus mode for maximum fault containment, but this results in multiple generators running at low load, which is inefficient and costly.

Emissions pressure: GHG regulations (e.g. IMO's CII, EU ETS) now make inefficient operation a compliance risk, not just a cost issue.



Closed bus operation: the proposition

- Efficiency gains:
  - Enables generator load consolidation,
  - Reduces total engine hours,
  - Improves fuel efficiency (up to 20%),
  - Supports hybrid systems (e.g. battery integration) more effectively.
- Risk implications:
  - A fault on a closed bus system can impact more systems due to interconnected switchboards,
  - Poorly coordinated protection systems may lead to blackout and loss of position,
  - Historical incidents (e.g. 2021 synchronisation failure) highlight the operational risks.

Requirements for safe implementation

1. Technical Confidence

- Protection Systems must:
  - Be selective and fast-acting,
  - Isolate faults within milliseconds,
  - Ensure fast bus-tie response,
  - Maintain fault ride-through,
  - Support Worst Case Failure Design Intent (WCFDI).
- FMEA Rigour:
  - Must reflect actual closed bus modes and include realistic failure assumptions.
  - Testing should go beyond paperwork—dynamic, witnessed, and scenario-based.

2. Operational Competence

- Crew must be trained on:
  - Protection logic and breaker sequences,
  - Alarm handling,
  - Operating within closed bus limits and failure modes,
  - Bridging documentation and automation boundaries.
- HMI and alarm design must support situational awareness and timely decision-making.

3. Design Integration

- For vessels with energy storage:
  - Batteries can support ride-through and reduce peak demands,
  - Requires tight EMS-DP coordination and tested logic integration.

Industry-wide needs

- Harmonised class notations: Current variations across societies create confusion. There is a need for standardised closed bus criteria linked to DP redundancy class,

- Improved IMCA Guidance: Updates are underway to cover testing protocols, load sharing strategies, and protection settings,
- Incident Data Sharing: Anonymised blackout/failure data should be shared to strengthen industry learning,
- Client Awareness: Charterers must understand both the fuel/emissions savings and the safety measures underpinning Closed Bus use.

Conclusion

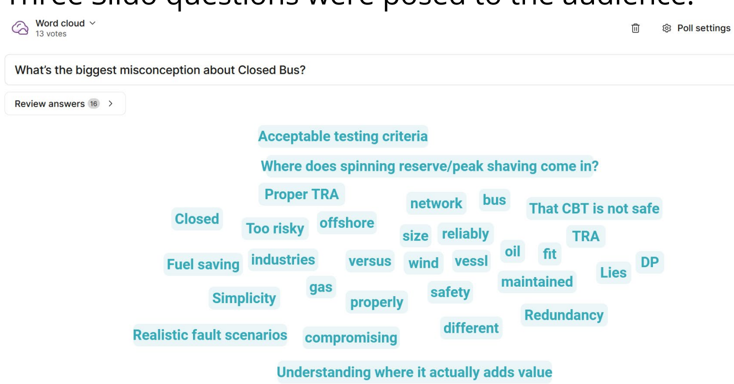
Closed Bus operation is not a shortcut – it is a high-potential strategy that, if engineered and operated correctly, can balance efficiency with robust safety. The future of DP in a low-carbon world likely depends on how well the industry adopts and normalises this approach. IMCA calls on all stakeholders to contribute insight and experience, ensuring that closed bus operation becomes a trusted, standardised, and safe tool within the DP operational envelope.

Richard closed by outlining what IMCA would and would not do. IMCA would not prescribe closed bus as mandatory. The expectation is deliberate, justified operation, not default conservatism or opportunistic claims.

Richard summarised the direction with one message: "If you're going to use closed bus, know what you're doing. If you're not going to use it, be prepared to explain why."

He ended by inviting live Slido feedback to shape future guidance.

Three Slido questions were posed to the audience:



Open text
37 votes

What specific failure scenario worries you most?"

Anonymous
Intermittent faults leading to blackout

Anonymous
Cliënt acceptance

Anonymous
Full black out

Anonymous
Fully blackout

Anonymous
Failure propagation

Ranking
64 votes

Poll settings

Who needs to lead the next step: OEMs, operators, class, or industry bodies?

1. Class — 1.48
2. Operators — 1.41
3. Industry Bodies — 1.36
4. OEM's — 0.78

+ Add option

5 Session 2: Closed Bus Operation, Efficiency and Decarbonisation

Speaker: Hedzer Keulen, Lead for Decarbonisation – Heerema Marine Contractors

Hedzer Keulen opened his session by reflecting on the symbolic value of hosting the conference in Istanbul, a city shaped by its proximity to the sea. Drawing parallels between the Bosphorus Strait and offshore DP operations, he underscored the importance of safe, efficient navigation in highly dynamic environments. This theme of balance – between control, sustainability, and operational reliability – ran throughout his session.

Hedzer outlined the transformative impact of DP on offshore construction. Where anchor handling once dominated, DP-enabled vessels can now install subsea systems in deep, hostile environments. But this comes at a high cost. A large DP vessel can consume over 20 tonnes of fuel daily. The challenge, he said, is no longer just technical: “Efficiency has become ethical. Our industry’s credibility depends on it.”

The focus then shifted to closed bus operation – a fuel-efficient configuration still regarded with suspicion by many operators. While closed bus allows generators to share load and run closer to optimal efficiency, traditional thinking associates it with systemic risk: a single electrical fault could potentially trip multiple power sources.

Hedzer argued that this fear, while not unfounded, is increasingly outdated. He outlined a pragmatic view – closed bus, when conditions are right and controls verified, can improve both safety and sustainability. He emphasised that the industry already has the technology; what’s needed is cultural change and targeted competence.

Heerema has implemented TAM (Task Activity Mode) and CAM (Critical Activity Mode) configurations across its fleet. These include:

- CAM-DP3: Full open bus split with maximum redundancy,

- TAM-DP2: Reduced redundancy but optimised fuel use,
- CAM-DP3 closed-ring: Available but not widely used due to regulatory ambiguity, ESS integration challenges, and high testing demands.

	4-split	2-split	Closed-ring
Configuration	CAM-DP3	TAM-DP3	***Future CAM-DP3***
Minimum DGs	1 per SWB	2 per SWB	**2**
Total DGs	4 (or 8, 12)	4 (or 6, 8…)	**2 (or 3,4…)**
WCF	2 thrusters	4 thrusters	**2 thrusters**
Fuel saving	None	Small	**Medium**

Figure 7 – CAM & TAM Configurations

Heerema's success with Sakarya, Türkiye's flagship offshore gas field, demonstrated the value of DP in extreme conditions. In 2022, following an earthquake, Heerema executed a highly complex subsea umbilical recovery in record time, describing it as 'open-heart surgery offshore'. The project also illustrated how vessels can work safely in reduced redundancy configurations, with sound planning and responsive DP control.

The presentation closed with a forward-looking message. Hedzer called for leadership that blends honesty with ambition. "DP is not just a technology, it's a mindset." He challenged the audience to reconsider outdated conventions and invest in operational learning. "We have the tools, we need the will. Closed bus is not a risk. It's an opportunity, if we choose to use it right, " he concluded.

6 Session 2: Greenhouse Gas Transparency and DP Efficiency – A Boskalis Perspective

Speaker: Sjors Robertz, Boskalis

Sjors Robertz from Boskalis presented their perspective on the growing importance of greenhouse gas transparency and the role of DP in meeting future emissions targets. Their session tackled both regulatory realities and technical strategies, with a clear message: "We can only improve what we measure – and we must measure better."

He began by outlining the EU Emissions Trading Scheme (ETS) Phase IV and its implications for offshore support vessels (OSVs). Boskalis vessels operating in or through EU waters now fall under mandatory GHG reporting and credit requirements. This creates commercial pressure to reduce emissions without compromising safety or uptime.

Sjors presented a framework called the 'green DP pyramid,' highlighting three key enablers for emission-conscious DP operations:

1. Awareness – Operational teams must understand energy flow, load distribution, and idle consumption.
2. Monitoring – Real-time data dashboards, energy KPIs, and load vs. thrust mapping are critical.
3. Optimisation – Reducing running generators, smarter transit management, and encouraging open discussion on power settings.

'Green DP' is not just about new tech – it's about better use of existing systems.

Boskalis emphasised that many vessels already have the ability to operate more efficiently through closed bus configurations and hybrid modes, but these are often underused. Reasons include:

- Lack of confidence in protection systems,
- Insufficient training,
- Perceived client or class resistance.

They stressed that change requires support across departments, from technical management to bridge crew and project planners.

Case studies were presented comparing fuel consumption and emissions on identical projects using:

- Default generator settings (manual/manual, open bus),
- CAM-TAM profiles (engineered load-sharing modes),
- Hybrid DP and closed bus.

Results showed a 10–15% reduction in emissions simply through revised generator management and more efficient power allocation, without modifying hardware.

In closing, he urged the industry to move beyond minimum compliance and embrace GHG reporting as a driver of operational quality. “Regulators will force your hand. Clients will ask questions. And crew will deliver, if they are given the tools, data, and leadership.”

7 Session 3 – IMCA DP Conference 2025 – Quickfire Session Report

The Quickfire Session often provides an opportunity for small and medium-sized companies to showcase their ideas and innovations to industry leaders in a dynamic and inspiring way. For the 2025 DP Conference, four companies were invited to give a 10-minute presentation against the clock on their innovative or novel approach to a particular issue within the industry. The four companies chosen to present their ideas were:

7.1 Global Maritime – Data Centric Evidence in DP Trials

Speaker: Ben Hukins

Global Maritime's quickfire presentation championed the use of data-centric evidence to enhance the accuracy, accountability, and repeatability of DP trials. Referencing the OCIMF DP Assurance Framework and IMCA M190, the speaker highlighted that handwritten and vague records ('as expected') do not meet current expectations.

The talk outlined Global Maritime's golden rules for data-centric trials: evidence must be clear, timestamped, independently verifiable, and add value. Examples illustrated that poor-quality or blurry data undermines trials, while timestamped alarms and performance graphs demonstrate best practice.

Advantages of data-centric evidence include trend tracking, standardised reporting, and bolstering competence claims. However, challenges such as data storage, cyber security, and increased trial time must be addressed. The speaker concluded by encouraging industry collaboration to refine tools and definitions.

7.2 Session 3: DNV – Power System Modelling for DP

Speaker: Tomasz Takachuk

Tomasz from DNV presented on how computer simulations enhance understanding of power system behaviour during transient states, particularly in closed bus configurations. He drew attention to the fact that closed bus configurations, while fuel-efficient, increase the risk of full blackout compared to split or open configurations.

Using case studies and PowerFactory software, DNV builds models with all equipment parameters, protection logics, and transient response behaviours. Modelling identifies potential mismatches, such as asynchronous machine behaviour post-fault, which are difficult to assess with FMEA alone.

Key takeaways included the importance of simulation in verifying DP2 compliance, mitigating blackout risk, and providing clarity in increasingly complex hybrid and electric vessel systems.

7.3 Session 3: Sonardyne – SPRINT-Nav DP: A New Shallow Water Reference Sensor

Speaker: Edmund Ceurstemont

Edmund Ceurstemont introduced Sonardyne's SPRINT-Nav DP, a vessel-mounted acoustic and inertial position reference sensor developed to offer a GNSS-independent solution for DP operations in shallow water up to 230 metres.

SPRINT-Nav DP combines inertial navigation with Doppler velocity measurements and is deployed without the need for seabed infrastructure. Once initialised via GNSS, it can function autonomously for up to 24 hours, providing consistent DP reference output even during spoofing or signal loss.

Figure 8 – SPIRIT-Nav hull mounted transceiver

Notably, it also offers ADCP (Acoustic Doppler Current Profiler) functionality, giving real-time current data throughout the water column. Sonardyne emphasised its robustness, ease of use, and compatibility with existing DP systems.

7.4 Session 3: MIROS – From Guesstimates to Excellence in Wave and Current Monitoring

Speaker: Jonas Rostad

Jonas from MIROS delivered an engaging presentation on radar-based wave and current measurements that aim to replace subjective 'eyeball' assessments with precise real-time data. Their system, certified by DNV, enhances operational decision-making and safety, particularly in harsh offshore environments.

He outlined a 'seven-step' progression from traditional methods to advanced integration, including directional wave data, localised side-of-vessel measurements, and predictive analytics using radar.

MIROS sensors can detect variability in wave conditions on different vessel sides and offer motion prediction, which could be used for DP feed-forward control. The system is cost-effective and is already deployed on working vessels, contributing significantly to operational efficiency and safety assurance.

8 Session 4: Real-World Lessons from DP Incidents – A Driller's Perspective

Speaker: John Flynn – Master Mariner – Stena Drilling

John delivered a forthright and data-rich presentation from the operational frontlines of Stena Drilling, offering a sharp reality check on the current discourse around dynamic positioning incidents, human factors, and system reliability. Drawing on Stena's internal data from six DP3 rigs operating globally, John questioned prevailing assumptions around incident causation and advocated for a more data-led, hardware-centric approach to safety and performance assurance.

Key themes and findings

Human factors – primary or secondary?

Flynn challenged the industry's heavy reliance on human factors as the dominant root cause of DP station-keeping failures. Citing IMCA data and Stena's internal incident reports, he noted that most major incidents are mechanical or systemic in origin, with human error often acting as a secondary exacerbator rather than a primary cause. He warned against 'over-professionalising' DPO training at the expense of solving engineering reliability issues.

Incidents every 11 days – the scale of the problem

Across its fleet of six DP rigs, Stena recorded 32 DP-related events in 2024 alone, equating to one incident every 11 days. This included near-misses, high potential events, and a loss of position incident caused by failed PRS systems during moderate sea states. John extrapolated this to highlight the likely scale of underreporting across the broader offshore fleet.

Asset ageing and maintenance deficits

With a shrinking order book and vessels ageing beyond 15-20 years, John presented data showing declining reliability due to budget-constrained maintenance regimes and difficult access to spares, upgrades, and service engineers. He cited challenges in obtaining DP software updates in a timely fashion, leading to avoidable events that ultimately cost far more than the preventive solution.

Return to work procedures – industry gap

John highlighted a lack of standardised industry procedures for safely returning vessels to operation after DP incidents. He questioned the efficacy of current 'turn it off and on again' routines, calling for formalised post-incident verification, including phased return protocols and cross-checks involving marine assurance personnel.

Market pressures and competency erosion

John warned of a 'race to the bottom' in marine crewing due to short-term contracts and a reliance on zero-hour arrangements, arguing that high competency cannot be sustained if working conditions are not stabilised. He also criticised weak scrutiny of PSV providers, often driven by short mobilisation windows and lax vetting.

Audience interaction

The session concluded with an extended Q&A where John responded openly to industry questions. Topics included software version control, critical spares management, balancing old versus new systems, and operator involvement in return-to-work decisions. John highlighted gaps in communications, slow vendor response, and limited vessel-level insight into DP software reliability.

John's closing message: while human factors matter, they must not become the convenient scapegoat for systemic issues of ageing assets, maintenance deferral, and inadequate incident recovery frameworks.

Session 4: Cynthia Lopez (Simwave)

Cynthia Lopez, Director at Simwave, chaired this interactive session, assisted by Matthijs van de Moer and Carmilla Costa. In addition to her role at Simwave, Cynthia is Chair of IMCA's Europe & Africa Regional Committee and Chair of IMCA's Operations Committee. Her session used a simulated role-play to explore operational decisions related to power management systems on DP vessels, based on a real-world incident involving busbar limitations.

Scenario overview

The simulated vessel was a walk-to-work DP2 vessel operating at a wind farm, receiving a generator from tower F03. The vessel was fitted with two main propellers, two bow tunnel thrusters, and one bow azimuth thruster, distributed across three busbars. During lifting operations, busbar #3's load was capped at 20% due to a mission-critical equipment connection, a design feature that was unknown to the operational crew.

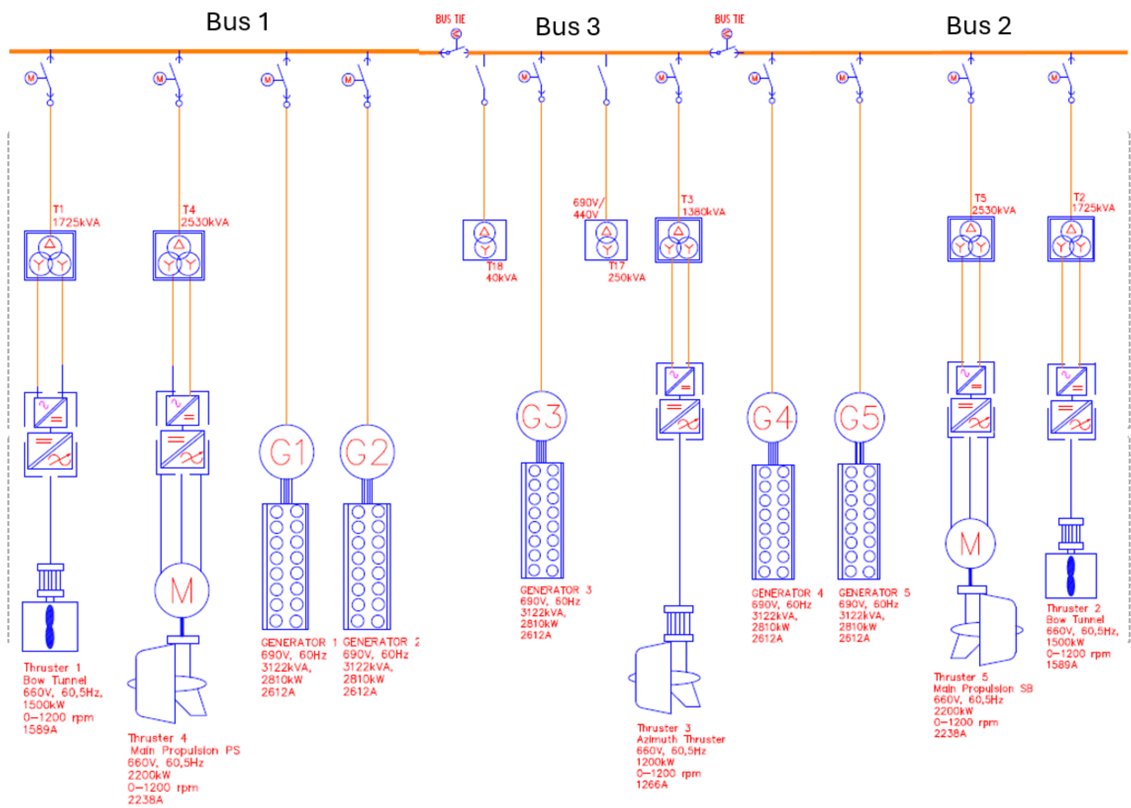


Figure 9 Vessel Bus setup

Key events and decisions

1. The chief engineer, ETO, and bridge team debated whether to switch to a closed-bus configuration to increase power availability for the bow azimuth thruster.
2. Audience participation via Slido was used to determine next steps, creating a 'choose-your-own-adventure' style format.
3. During operations, busbar 1 failed, causing a blackout and subsequent vessel drift.
4. The DPO team requested the crane operator to disconnect the load as the vessel lost position.
5. Once stabilised, the vessel recovered bus 1 and returned to collect stranded crew.

Debrief and discussion points

The post-incident discussion was rich in technical detail, covering:

- The limitations imposed by mission-specific equipment on power distribution,
- The importance of understanding power management design and its influence on DP performance,
- Miscommunication and knowledge gaps between engineering, operations, and bridge teams,
- The role of assurance processes and whether vessel designs are being adequately evaluated for mission integration,
- The value of joystick/manual control during high-risk drift-off scenarios,

- The need for after-action reviews and improved training, documentation, and retention of experienced personnel.

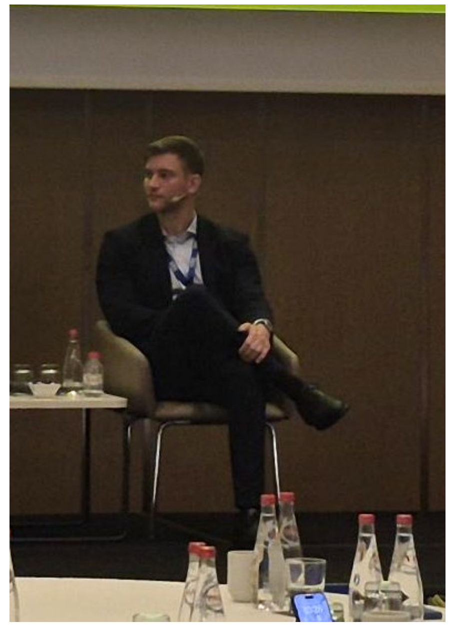
Conclusions

This session highlighted the critical importance of cross-disciplinary awareness onboard DP vessels. The limitation of the bow azimuth thruster due to a design choice not known by the crew almost led to loss of station keeping. Cynthia's roleplay facilitated an engaging discussion on open vs closed bus operation, technical design gaps, and the real-world implications of incomplete assurance processes.

DAY 2

9 Session 5: Reduction of GHG Technology

Speaker: Lars Jacobsen – Stillstrom



Lars Jacobsen, Head of Marine Operations at Stillstrom (a Maersk-owned venture), delivered a detailed and forward-thinking presentation on offshore charging technologies for DP vessels. His talk highlighted Stillstrom's development timeline, project experience, system safety features, and the vital role of digital integration in enabling emission-free maritime operations.

9.1 Company background and milestones

Stillstrom was founded in 2019 with funding from the Danish Maritime Fund. Key milestones include a collaboration agreement with Ørsted in 2021, a green anchorage feasibility study for Port of Aberdeen, successful vessel trials in 2024, and the development of VR training modules. Since the presentation was submitted, the team has grown from 25 to 28 employees, continuing to build on Maersk Supply Service's decades of offshore experience.

9.2 Offshore charging concept

Stillstrom acts as the bridge between green offshore energy and user demand, primarily focusing on Service Operation Vessels (SOVs). Its system offers modular charging solutions including:

- Hang-off systems on substations (OSS)
- Monopile-mounted units
- Standalone offshore charging buoys

These configurations are adaptable to various offshore wind scenarios and vessel types.

9.3 Integrated, holistic approach

The company delivers a complete solution beyond hardware. Each deployment includes:

- Business case development and ESG alignment,

- SOV integration support,
- Crew training using virtual reality (VR) modules,
- Wind farm integration,
- Legal, regulatory and operational planning.

Jacobsen stressed that standardisation is not possible; solutions must be tailored to vessel and site-specific requirements.

9.4 Safe and efficient operations

Stillstrom operations are based on existing offshore practices (e.g. IMCA guidelines, oil and gas standards) and adjusted for specific conditions. The product development includes full-scale simulation and testing with industry operators: DPOs, captains, engineers, and deck crews.

Jacobsen also showcased their digital user interface – a decision-support tool for charging operations that logs data, monitors vessel position, weather, alarms, and guides the user through step-by-step procedures while ensuring full operator control.

9.5 System demonstration and video walkthrough

Lars concluded with a video demonstrating a full SOV offshore charging cycle:

- Manual messenger line retrieval was the only non-automated task,
- A charging cable is delivered to the vessel's VCU unit,
- Once latched, visual and digital confirmation is required before energy transfer,
- The vessel retains flexibility in heading and positioning during operations.

Automation and distance from the structure (approx. 16m steel-to-steel) enhance safety and reduce operational risk.

9.6 Closing remarks

Jacobsen emphasised Stillstrom's ambition to lead offshore power and charging solutions into a commercially and technically viable space. He also praised the conference dialogue and called for continued collaboration across vessel operators, OEMs, and offshore wind stakeholders to realise decarbonisation goals.

10 Session 5: Reduction of GHG – People

Speaker Daniel Flato – Bernhard Schulte Shipmanagement

Daniel Flato, Marine Superintendent and Company DP Authority at Bernhard Schulte Shipmanagement (BSM), presented a comprehensive session on the operational realities and emissions-saving potential of CBT operations. Drawing from BSM's experience with hybrid DP vessels, the presentation emphasised that emission reduction is as much about people and procedures as it is about technology.

10.1 Company background and fleet context

BSM, the ship management arm of the Schulte Group, operates over 200 vessels in full management and 480 in crew management. While deeply rooted in conventional shipping, BSM Hamburg is now managing six offshore vessels (five of which are CSOVs), with significant fleet expansion underway. All newbuilds are designed for CBT operation with DC grid and variable-speed gensets.

10.2 Closed bus tie – efficiency and risk

Flato noted that operating in CBT mode can reduce fuel consumption significantly by avoiding low-load operations across multiple generators. However, CBT carries real risks, it creates pathways for cascading failures unless the system is thoroughly designed, tested, and understood.

10.3 The role of people in GHG reduction

People were at the core of Flato's message:

- Decision-making by DPOs and ETOs has a direct effect on fuel efficiency,
- Crew awareness, operational discipline, and understanding of power management systems are vital,
- Robust CPD programmes (eg IMCA E5 module) and the IMCA M117 framework support continuous learning,
- Training needs to include OEM-specific power management sessions and situational awareness drills.

10.4 Procedures and preventive systems

A major theme was the importance of clearly written, readily understood operational procedures:

- CBT-capable vessels must have operational manuals tailored to activity-specific configurations,
- Maintenance systems must monitor battery health, switchgear status, and DP system integrity,
- Crew changeovers are frequent, so documentation must be instantly accessible and self-explanatory,
- Regular DP drills and continuous hazard awareness are crucial to safety.

10.5 Case study: Windea Curie

The Windea Curie is a newbuild CSOV designed with three diesel generators and a hybrid battery setup. The DP system is being tested with four worst-case failure scenarios including:

- Full CBT,
- Split bus tie (two gensets and one genset/battery),
- Partial CBT (middle bus connected),
- Fully open configuration.

In CBT mode, expected fuel reduction is up to 35%, provided sea trials confirm safety integrity. The battery can support over five minutes of power in a failure event – enough to abort operations and restore stability.

10.6 Conclusion and path forward

CBT is not a one-size-fits-all solution, but its efficiency benefits are undeniable. Flato concluded that crew training, proactive maintenance, and integrated operational design are key enablers. Decarbonisation will require not only advanced technology but a commitment to supporting people through procedures, documentation, and continuous learning.

11 Session 5: Reduction of GHG – Fuels

Speaker: Nikos Vasileiadis – IMCA

Nikos Vasileiadis, Maritime Consultant at IMCA, delivered a highly detailed and data-driven presentation exploring the viability of alternative and low-GHG fuels for DP vessels. This talk formed a cornerstone of the conference's wider decarbonisation theme, examining the readiness of the DP fleet, fuel technologies, emissions performance, and practical challenges.

11.1 DP fleet readiness and fuel transitions

Globally, approximately 4,500 vessels are classed as DP in the offshore, dredging, and tug sectors. Yet, as of May 2025, only 1.2% of these are capable of using alternative fuels, and most of these are LNG-ready. However, 20% of the DP vessel orderbook is 'alternative-fuel ready', with methanol being the most preferred option.

11.2 Why alternative fuels?

The use of low-GHG fuels enables emission reductions even without lowering energy consumption. This complements other decarbonisation strategies such as hybridisation and closed bus operations. Additionally, regulatory pressure has intensified: if implemented, the IMO's Net Zero Framework will mandate reductions in annual GHG fuel intensity – a key metric in offshore compliance going forward.

11.3 Fuel comparisons: lifecycle emissions

Fuel lifecycle emissions – from 'well to wake' – depend heavily on production pathways. Highlights include:

- Bio-LNG: Up to 66% GHG savings vs. MGO; Green LNG: Up to 93%,
- Methanol (green/synthetic): Nearly complete GHG elimination potential,
- Ammonia and hydrogen: Green versions can drastically reduce GHGs; fossil versions do not offer benefits whatsoever,
- Hydrogen (blue): Zero GHGs possible but reliant on CCS efficiency.

11.4 Fuel performance in offshore/DP applications

Each fuel type has distinct implications for DP operations:

LNG: Proven track record on DP vessels, strong maturity, but methane slip is a concern (especially under low loads). Requires double-walled piping and ventilation safeguards.

Methanol: Readily stored under ambient conditions and used as cargo. Corrosive and toxic, but existing dual-fuel engine technology supports it. Fuel switching is seamless on DP.

Ammonia: High tank-to-wake savings but suffers from toxicity, material compatibility issues, and slow combustion. May require MGO pilot fuel for low-load DP ops.

Hydrogen: Low energy density demands large tank volume. Fuel cells (especially solid oxide) are promising but not ideal for high load variation scenarios typical of DP.

Biofuels: Require minimal vessel modification. Operationally stable on DP but watch for stability, cold flow, and corrosivity concerns.

11.5 Fuel storage and onboard space requirements

Volume considerations are significant:

- LNG tanks require up to 5x the space of MGO,
- Methanol needs ~2.5x more storage volume than MGO,
- Ammonia tanks ~4x MGO; less than LNG,
- Hydrogen tanks ~8x MGO volume.

Biofuels are closest in density and handling to MGO, making them an easier retrofit option.

11.6 Fuel availability and supply chain

Fuel infrastructure varies widely:

- LNG: 190+ bunkering ports with more under development,
- Methanol: 100+ planned production facilities, 10 Mt/y split between bio and synthetic,
- Ammonia: 133 Mt of announced capacity globally,
- Hydrogen: Rapid growth forecast, with potential for 38 Mt low-emissions production by 2030,
- Biofuels: Most accessible today, with 200+ demo and commercial facilities.

11.7 Conclusions and recommendations

Nikos emphasised that there's no 'one-size-fits-all' solution and therefore different needs require different solutions. Offshore vessels require flexible solutions tailored to operational profile, availability, geography, regulatory pressure, and vessel design. He urged shipowners to consider crew training and infrastructure development in parallel with vessel procurement and retrofitting.

His closing remark: "If you ask me what fuel to choose, I'll ask, for what, where, and how much?"

12 Panel Session: Reduction of GHG Emissions

This session, moderated by IMCA Technical Director Jim Cullen, brought together several key speakers from the day's presentations to answer questions directly from the audience and via the Slido platform. The panel focused on addressing challenges and opportunities in reducing GHG emissions in offshore operations, drawing on recent innovations in vessel design, fuel selection, digital tools, and operational procedures.

12.1 Panel members

- Lars Jacobsen (Stillstrom)
- Daniel Flato (BSM)
- Nikos Vasileiadis (IMCA)
- Audience contributors, including Mark from the floor
- Moderated by: Jim Cullen (IMCA Technical Director)

12.2 Key discussion highlights

12.2.1 Emergency disconnection and redundancy in offshore charging (Stillstrom)

Lars Jacobsen outlined the emergency disconnection features of Stillstrom's offshore charging system, including:

- Remote disconnection from the bridge by the DPO,
- Local emergency release on the VCU unit,
- A mechanical fail-safe that activates under excess tension.

These systems ensure redundancy and personnel safety during charging operations.

12.2.2 Closed bus operation and crew training (BSM)

Daniel Flato emphasised the importance of crew competence in safely managing closed bus tie operations. Key points included:

- A thorough understanding of the vessel's FMEA and electrical systems,
- Training for safe response under failure scenarios,
- Promoting efficiency and emissions reduction without compromising safety.

12.2.3 IMCA's work on alternative fuels (IMCA)

Nikos Vasileiadis provided an update on IMCA's work:

- IMCA's Greenhouse Gas Committee has launched a focused Alternative Fuels Workgroup,
- The group is examining challenges related to safety, operations, and fuel availability,
- Upcoming tools and guidance will be published to support industry decision-making.

Nikos stressed IMCA's desire to collaborate with the industry to accelerate responsible fuel transition.

12.2.4 Standardisation and smart anchorage

Lars responded to technical questions on voltage standardisation and ship compatibility:

- Current offshore charging products deliver 6–8 MW but are scalable,
- A standard plug is in development for use across vessels and locations,
- The goal is consistent user experience, simpler maintenance, and wider adoption.

12.2.5 Questions on nuclear and ethanol fuels

Nikos explained that:

- Nuclear is already in use in military vessels but presents challenges for commercial offshore due to safety, regulation, and public acceptance,
- Ethanol was out of scope for his research but acknowledged as a potential fuel undergoing further study.

12.2.6 Selling GHG Strategies to Charterers (BSM)

Daniel noted growing interest from charterers in visible GHG reduction:

- Effective training and efficient operations are key selling points,
- Drill periods and idle time can be repurposed for training without impacting productivity,
- Extended drills should be explained as part of long-term fuel efficiency and safety.

12.2.7 Concerns over fraud in biofuels

Nikos acknowledged the presence of fraud in 'green' fuel certification:

- Mixing of fuels and mislabelling are major issues,
- The IMO's upcoming Life Cycle Assessment guidelines (due 2027) are intended to address this,
- He emphasised the need for robust regulatory frameworks and industry vigilance.

12.2.8 Audience challenge: are alternative fuels a fantasy?

A participant from the floor expressed concerns about:
- Food supply pressures linked to biofuel feedstock,
- Ammonia's demand on fertiliser supply,
- Greenwashing and the unrealistic promotion of alt-fuels.

Nikos replied frankly:
- All solutions come with trade-offs,
- Industry must pursue multiple solutions in parallel – not just alt-fuels or nuclear.
- Transparency and realism are critical to maintaining trust: "No fuel is perfect. It's about choosing the best option for the mission, vessel and region."

12.2.9 Carbon capture and storage (CCS)

CCS was acknowledged as promising but immature:
- Space, equipment, and infrastructure demands are currently prohibitive offshore,
- Nikos noted the debate on whether CCS enables GHG reduction or delays harder decisions.

12.2.10 Digital twins and training simulators

Daniel Flato and Lars Jacobsen both spoke to digital tool usage:
- BSM is developing simulator training linked to real DP systems, especially in LNG bunkering,
- Stillstrom is investing in digital decision-support tools for DPOs to simplify real-time operations.

12.2.11 Keeping vessel design simple

A final question from the floor asked whether vessel design complexity was compromising crew safety.
- Panellists agreed: simplicity should be a goal, but modern efficiency systems do require added complexity,
- Progress in ergonomic UI and modularity was helping reduce the training burden despite technological growth.

The session concluded with applause and appreciation for the candid and wide-ranging discussion.

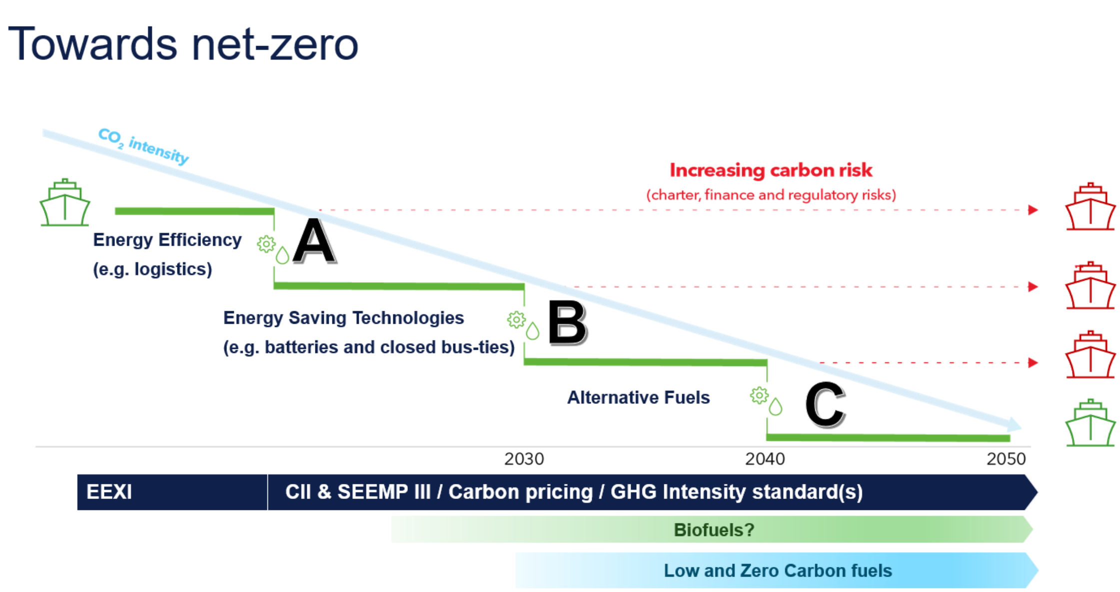
13 Session 6: Implications of Gren House Gas Emission Reduction on DP

Speaker: Aleks Karlsen – DNV

Aleks Karlsen, Senior Principal Specialist in Dynamic Positioning Systems at DNV, delivered a comprehensive and forward-looking presentation on the implications of greenhouse gas emission reductions for DP operations. His address captured the technical, operational, and regulatory shifts shaping the industry and offered insight into how evolving system integration, assurance processes, and technology must support both safety and decarbonisation objectives.

13.1 Emissions reductions and system complexity

Karlsen emphasised that the offshore industry has already achieved considerable gains by tackling the 'low-hanging fruit' of emissions reduction. Efficiency gains from hybridisation, reduced generator use, and digital optimisation are increasingly common, but have led to more complex and software-dependent systems.



Where DP systems once favoured simplicity, separation, and redundancy to maximise safety margins, today's systems aim for operational optimisation. CBT operation, reduced spinning reserve, and minimised genset usage now place far greater demands on:

- Measurement and monitoring,
- Transient system response prediction,
- Accurate failure mode analysis,
- Software-based safety functions.

13.2 Balancing risk and reward

Karlsen cautioned that operators are simultaneously changing:

- System design,
- Technology platform,
- Operating modes.

This concurrent evolution introduces significant complexity, challenging traditional assurance processes. He identified the need to modernise testing and verification tools, with stronger use of:

- Simulators,
- Data-driven verification (DDV),
- Model-based consequence analysis,
- Continuous operational awareness and crew competence.

13.3 Assurance and regulatory evolution

Karlsen highlighted the limitations of relying solely on IMO minimum standards, such as IMO's 1994 and 2017 DP guidelines, noting their infrequent updates. In contrast, DNV offers dynamic tools and evolving guidance, including:

- RP-0591: Closed Bus-Ties,
- RP-0684: DP System Integration,
- ST-0111: DP Capability,
- New notations: CBT, CBS, CV, and AROS (for remote/autonomous vessels),
- A new JDP on enhanced DP consequence analysis.

13.4 Design trends and emerging challenges

Karlsen identified future vessel trends including:

- Electrification and hybrid powerplants,
- Dual-fuel engines and battery systems,
- Offshore charging and shore power integration,
- Autonomous and remote operations.

With these developments comes increased dependency on digital infrastructure, requiring careful management of software parameters, safety logic, and crew interface.

13.5 Human element and crew simplicity

The human element remains critical. Karlsen warned against overburdening crew with system complexity:

- Complex systems must be designed to present simplified, intuitive interfaces,
- Training must evolve to match technological sophistication,
- Competence is needed not only for crew but also designers, class societies, and insurers.

13.6 Conclusion

Aleks Karlsen closed with a clear message – achieving both safety and GHG reductions is possible, but only with investment in equipment, systems, operational procedures, and people. The industry must modernise assurance frameworks and maintain a collaborative mindset to ensure robust and future-ready DP operations.

14 IMCA DP Conference 2025 – Final Panel: Ask the Industry – Addressing Key Issues

The closing session of the IMCA DP Conference 2025, moderated by Joey Fisher (IMCA DP Committee Member), brought together a heavyweight panel of experts to debate one of the industry's most contentious operational topics: "closed bus operation". It was a frank and often polarised discussion that tackled regulatory uncertainty, operational risk, OEM readiness, and future standards.

14.1 Panel members

Richard Purser – IMCA Technical Adviser
Suman Muddusetti – MTS DP Committee Chair / Shell MRT
Tomasz Tkaczow – DNV, Head of Power Systems & Electrification Advisory
Graeme Lorenson – Subsea 7, DP, Electrical & Controls Technical Authority
Stijn Souffriau – Boskalis, Project Manager E&I
Frode Lium – ABB, R&D Product Manager Onboard DC Grid

14.2 Objective

The session aimed to weigh the practical benefits of closed bus operation, fuel efficiency and emissions reduction, against safety-critical challenges such as blackouts, loss of position, and unclear regulatory compliance. The panel explored how the industry can move from risk aversion to responsible adoption.

14.3 Key themes and interventions

14.3.1 Blackout tolerance vs learning curve

Graeme Lorenson posed a stark question: "Do we want to learn one blackout at a time?" He stressed that with more vessels arriving preconfigured for CB, the industry cannot avoid the issue. Subsea 7, he noted, is seeing a fleet where 50–60% of vessels are built CB-capable, but few operators are willing to switch it on.

14.3.2 Practical and regulatory blockers

Suman Muddusetti argued that oil majors are not the obstacle. "We're all aligned," he said. "But we can't yet prove it's safe enough." He cited a lack of robust testing evidence and the industry's culture of conservatism. Shell MRT has hybrid vessels with CBT built in, but that doesn't mean they can use it without comprehensive operational and procedural assurance.

14.3.3 DNV's risk-based approach

Tomasz Tkaczow highlighted DNV's modernised guidance for assessing CBT configurations. He called for design and operational strategies that allow safe fault ride-through, not just isolation. DNV's RP-0591 and model-based consequence analysis tools were flagged as next-generation assurance aids.

14.3.4 Boskalis: make the risk visible

Stijn Souffriau advocated for real-time risk visualisation, noting that the crew often lacks insight into what's at stake. He showed how Boskalis is using dashboards to translate system state into 'traffic light' safety cues, giving DPOs clear guidance on risk levels before switching modes.

14.3.5 ABB's OEM perspective

Frode Lium gave an OEM view, expressing confidence in CBT technology if it's correctly integrated and validated. He highlighted ABB's closed-loop grid protection schemes and adaptive fault management but noted that many operators request 'dumbed-down' systems that negate CBT benefits.

14.3.6 The role of IMCA

Richard Purser reiterated IMCA's position: "CB is not inherently unsafe, but it does need rigorous and documented assurance." He echoed the theme of the week, that technology is outrunning standards. Purser noted that M190 and M166 will continue to evolve to reflect modern risks, but that industry-wide behavioural change is also required.

14.4 Audience engagement and poll results

Live Slido polls revealed hesitancy about CBT adoption, with key concerns being:

- Unclear regulatory acceptance,
- Blackout consequences,
- Insufficient crew training.

The audience also ranked 'enhanced testing and assurance' as the top priority to enable safe CBT usage.

14.5 Concluding notes

Joey Fisher wrapped up the session with a challenge: "We either get ahead of the technology, or it leaves us behind." The session closed with high engagement and sparked follow-on discussions in breakout groups.

15 Conclusion – IMCA DP Conference 2025

The 2025 IMCA DP Conference underscored a growing divide between today's fleet and tomorrow's expectations. While much of the existing DP fleet is likely to continue operating in familiar ways, the new generation of vessels is being built with far more flexible power configurations, designed from the outset for hybrid operation, closed bus modes, and emissions-aware performance.

This shift demands more than hardware. It requires deeper operational understanding, rigorous verification and validation, and far greater scrutiny of single-point failures across all configuration modes. Delegates repeatedly highlighted that confidence in these new systems will come not from hope or habit, but from clear data, competent operation, and realistic testing.

Closed bus operation emerged not as a risky exception but as a viable, and in many cases preferable, option when backed by appropriate system design and trained personnel. The focus must now move from theoretical acceptance to operational normalisation, supported by targeted guidance, consistent training, and a willingness to challenge legacy mindsets.

The technology is no longer the barrier – but the ageing fleet is. Most existing vessels weren't built with the flexibility, integration, or redundancy required for safe, efficient closed bus or hybrid operation. No amount of guidance or training will overcome those design limitations. If the industry is serious about reducing emissions without compromising safety, the focus must shift to building and operating new-generation vessels that are designed for configuration flexibility, verified through rigorous testing, and resilient to single-point failures. The message is clear: we can't retrofit our way to progress. It's time to invest, standardise, and deliver.

15.1 Action items

Update guidance

IMCA to revise and expand guidance documents (e.g. M190, M166) to better support closed bus operations, emissions-aware DP configurations, and hybrid system integration.

Promote competence and training

Accelerate uptake of simulation-based training and CPD covering CBT, energy storage systems, and emissions monitoring, using M117 as baseline.

Drive risk-based practice

Encourage members to use TAMs, TAGOS, and consequence analysis tools to justify operational modes based on actual risk and vessel capability, not default settings.

Enhance Industry Collaboration

Engage with OEMs, class societies, and charterers to align technical interfaces, regulatory expectations, and terminology, particularly around shore power, hybridisation, and fuel transitions.

16 Workshop Day 1: “Closing the Bus Without Opening Risk”

This interactive workshop aimed to challenge assumptions around default DP power configurations, particularly the habitual use of rolling reserve and open bus arrangements. Participants explored operational, technical, and human considerations affecting the safe and viable use of closed bus configurations in DP operations. Key themes included reliability, autonomy, procedural assurance, and risk ownership.

16.1 Key themes and findings

16.1.1 Rolling reserve – still relevant?

- General view: Yes, this is still valid, particularly for high-risk operations.
- Conditional acceptance: Use under risk-assessed scenarios, with supporting TAMs, test data, and contingency plans.
- Alternatives discussed: ESS/batteries, fuel cells, purpose-built or fully electric vessels
- Workshop message: Rolling reserve is still useful, but not the only tool. Needs to be chosen, not defaulted.

16.1.2 Open Bus – operational crutch or safety net?

Concerns raised:

- Used as a fallback due to uncertainty or lack of trust in closed bus.

Risks include: running DGs at low loads for long periods, incorrect power management.

Hidden Risks: Cross-connections, load swings and instability, misinterpreted as ‘always optimal’.

16.1.3 Closed bus – is it really unsafe?

Myth busted: Incidents are not due to the concept of closed bus, but poor design/testing:

- Enablers for safe use: Physical testing, realistic simulation training, validation and verification,
- Perceived risks: CPD gaps, configuration errors, common mode failures,
- Acceptance path: Start with blow-off tests, prove no blackout, ALARP for human/environmental risk.

16.1.4 Technology and human factors

- Enhanced reliability notations and battery systems improve redundancy and autonomy,
- Documentation often less comprehensive for open bus,
- Terminology warning: Avoid using 'default'; use 'suitable for purpose',
- Education and training: Key to operational risk management and crew confidence.

16.1.5 Risk ownership and operational decisions

- Nuances in WSF and CBT concepts; tendency to give 'free pass' to open bus,
- Skills and training must not be eroded; accountability must be clear,
- Operational guidance should allow case-by-case justification due to vessel variability.

16.2 Conclusions

The workshop made it clear that the industry must move beyond defaulting to familiar DP power modes and instead adopt configurations based on risk, capability, and context. Closed bus operation, often seen as a higher-risk option, can in fact be just as safe as open bus, provided it is supported by appropriate system design, rigorous validation, and targeted crew training.

Yet safety is not solely a function of hardware. Crew confidence, operational autonomy, and well-documented procedures are equally critical. When these elements are in place, closed bus operation becomes not only viable, but often preferable from an efficiency and emissions standpoint.

To support this shift, IMCA's future guidance should move away from binary positions and instead reflect the operational nuance seen in real-world vessel behaviour. One size will not fit all, and our documentation should empower operators to make informed, risk-based decisions, rather than rely on tradition or assumption.

16.3 Suggested Actions

1. Review and update DP guidance documents to reflect evolving philosophies.
2. Encourage risk-based assessments over habitual defaults.
3. Mandate competence development and simulation for closed bus acceptance.
4. Promote leading practices from hybrid/battery-enhanced vessels.

17 Workshop Day 2: "Closed Bus Operation – Efficiency without Compromise"

This workshop explored operational, economic, and regulatory drivers for transitioning toward more efficient, lower-emission DP operations through closed bus configurations. Participants challenged assumptions around cost, regulation, and vessel capability while identifying barriers and opportunities for adopting low-emission technologies such as hybrid propulsion and energy storage systems (ESS).

17.1 Key insights and outcomes

17.1.1 Governance and policy drivers

- Standardisation is essential for scalability.
- Financial investment is expected to drive technological progress.
- Regulations must target actual emissions, not just tank input volumes.
- Tech adaptation must be supported by regulatory flexibility.

17.1.2 Risk and validation

- Comprehensive risk assessment is foundational.
- Client confidence is key to implementation.
- Demonstration and validation of concepts are necessary.
- Post-failure capability and fault tolerance must be considered.
- Time and cost are recognised constraints.

17.1.3 Regulatory balance

- A balance must be struck between safety, cost, and efficiency.
- Over-regulation risks stalling innovation.
- Active, productive engagement with regulators and class societies is needed.
- Systems should be configured to operational conditions, not fixed templates.

17.1.4 Practical efficiency measures

- Analyse risk using TAMs and TAGOS tools.
- Optimise operations: watch circles, transits, and eco-modes.
- ESS for peak shaving, shore power integration, and DC bus operations.
- Engage in early planning with charterers and contractors.

17.1.5 Barriers to hybridisation

- Ship Energy Efficiency Management Plan (SEEMP) not suited to station-keeping vessels.
- Existing vessel designs often lack space for hybrid systems.
- Cost assumptions are often far too optimistic.
- DP misunderstood by many stakeholders.
- Misalignment between vessel capabilities and client expectations.

17.1.6 Knowledge gaps and enablers

- TAGOS were identified as useful for education and fuel saving.
- Sharing lessons from successful and failed hybrid deployments is key.
- Incentivising EPCI contractors to consider emissions reduction.
- Reward overachievement; flag missed targets transparently.

17.1.7 Infrastructure and standards

- Lack of skilled resources is a major bottleneck.
- Standards for shore power plugs and voltages are inconsistent.
- Overly rapid or poorly coordinated regulation can destabilise progress.
- Greenwashing risks: carbon tokens seen as false economy.

17.1.8 TAGOS and DP efficiency gains

- Use eco-mode, speed management, hull cleaning (5% saving), and advanced coatings.
- Avoid cutting corners in DP testing.
- Promote training, feasibility studies, and use of third-party experts.

17.1.9 Decision-making and tendering

- Clear logistics and definitions around 'zero emissions' are needed.
- Cost transparency and shared language in tenders are essential.
- A strong business case, backed by data, drives adoption.
- Ultimately, data-driven decisions will shape the future of closed bus efficiency.

17.2 Conclusion

17.3 The workshop highlighted that while closed bus operations have clear potential to improve fuel efficiency and reduce emissions, widespread adoption remains constrained by inconsistent standards, limited operator confidence, and regulatory inertia. Participants recognised that technological capability is no longer the main barrier—the challenge now lies in governance, integration, and trust.

17.4 A shift in mindset is needed, from compliance-driven power philosophy to performance-optimised decision-making. Crew competency, risk-based planning, and early collaboration between vessel operators, OEMs, and clients emerged as critical enablers.

17.5 Ultimately, the industry must move beyond theoretical acceptance of closed bus towards operational normalisation, supported by data, training, and transparent engagement with regulators and stakeholders. Closed bus can deliver efficiency without compromising safety, but only if we actively design for it, rather than default to legacy habits.

17.6 Suggested outcomes

1. IMCA should maintain and update guidance or a technical bulletin on safe closed bus operation, detailing conditions for use, integration with ESS, and risk-based operational frameworks.

2. Encourage members to adopt TAGOS and TAMs to support emissions reduction and efficiency in DP operations, with IMCA providing case studies and scenario-based training modules.

3. Engage with OEMs, class societies, and charterers to standardise hybrid and shore power interfaces, and align operational expectations with vessel capabilities.

4. Promote upskilling and CPD in hybrid power systems, closed bus configuration, and emissions-aware DP operation to close critical knowledge gaps and ensure safe adoption of advanced technologies.