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Digital DP Trials, Real Challenges: Defining Evidence in Modern DP Assurance

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1. Abstract

Dynamic Positioning (DP) assurance is shifting from narrative reports to data-centric evidence, as required by IMCA M 190 and the OCIMF DP FMEA Assurance Framework.

This paper presents practical methods for capturing structured, timestamped data from vessel systems (direct log imports), automatically tagging metadata, and synchronizing events across DP logs, IAS screens, and crew actions.
Using triangulation combining at least two independent sources creates robust, defensible results and reduces costly repeat trials. Case studies show how digital evidence closed charterer comments without re-testing, preventing off-hire and project delays.
The paper also addresses the evolving role of the surveyor, whose expertise remains vital for detecting maloperation and interpreting context.
Finally, Global Maritime's roadmap outlines minimum evidence checklists, DP App compliance validation, and a shared case library to set a new benchmark for DP assurance. Together, these steps improve reliability, traceability, and client confidence..

2. Abbreviation / Definition

ABS	American Bureau of Shipping
BV	Bureau Veritas
CAM	Critical Activity Mode
DNV	Det Norske Veritas
DP	Dynamic Positioning
FMEA	Failure Modes and Effects Analysis
FMECA	Failure Modes, Effects and Criticality Analysis
GM	Global Maritime
IAS	Integrated Automation System
IEC	International Electrotechnical Commission
IMCA	International Marine Contractors Association
IMO	International Maritime Organization
OCIMF	Oil Companies International Marine Forum
QA	Quality Assurance
TAM	Task Appropriate Mode
UPS	Uninterruptible Power Supply
WCFDI	Worst-Case Failure Design Intent

3. Introduction

Dynamic Positioning (DP) assurance is a cornerstone of safe and reliable offshore operations, ensuring that vessels can maintain position and heading even in the event of equipment failures. Traditionally, DP FMEA proving trials and annual trials have relied heavily on manual evidence collection handwritten notes, single screenshots, and narrative reports provided by attending surveyors. While this approach has served the industry for decades, it has clear limitations: results can be subjective, difficult to verify independently, and prone to omission or human error.

Recent guidance from IMCA M 190 (Section 5.9.1) and the OCIMF DP FMEA Assurance Framework (Section 2.6) has raised the bar by requiring objective, data-centric evidence for every test result. These documents explicitly state that handwritten notes or generic phrases such as “Pass as expected” do not meet the intent of data-centric evidence unless supported by corroborating data. This shift reflects a wider industry expectation for structured, auditable, and repeatable results that can withstand external scrutiny by charterers, class societies, and regulators.

The transition to digital, data-driven trials is therefore not just a technical upgrade but a fundamental change in how DP assurance is executed and communicated. By combining structured templates, direct log imports, and metadata tagging with the expertise of attending surveyors, it becomes possible to produce a complete and verifiable record of vessel performance. This approach not only reduces the risk of costly repeat trials and vessel off-hire but also builds long-term confidence among all stakeholders.

This paper explores the practical application of data-centric evidence in DP assurance, including lessons learned from real case studies, methods for cross-verifying results through triangulation (DP operator screen, IAS screen, manual lever confirmation), and the evolving role of the surveyor. It also presents Global Maritime’s roadmap for standardizing minimum evidence requirements, implementing digital workflows, and sharing anonymized case libraries to promote learning across the fleet.

4. Background

Dynamic Positioning (DP) systems are safety-critical, enabling vessels to maintain position during drilling, construction, and offshore operations. To ensure that DP systems function as designed, industry practice requires FMEA-based proving trials for newbuilds and conversions, followed by annual DP trials and, increasingly, trials after significant modifications. These trials verify that the vessel’s Worst-Case Failure Design Intent (WCFDI) is achieved and that redundancy concepts are correctly implemented.

Historically, evidence from these trials has been collected manually by attending surveyors and vessel crews. Records often consist of handwritten notes, photographs of mimic screens, and simple “As expected” annotations in spreadsheets or checklists. While sufficient in the past, this approach presents several challenges:

- Subjectivity: Narrative-only results depend on the interpretation of the attending surveyor.
- Incompleteness: Missing timestamps, signatures, or supporting logs make results difficult to audit later.
- Variability: Different surveyors, clients, and vessels may apply different standards, leading to inconsistent evidence quality.
- Rework Risk: Poor or ambiguous records can lead to charterer rejection, repeat trials, cost overruns, and delayed project starts.

Recognizing these issues, IMCA M 190 and the OCIMF DP FMEA Assurance Framework have introduced explicit expectations for objective and data-centric evidence. IMCA Section 5.9.1 states that "objective evidence should be provided for test results," while OCIMF Section 2.6 specifies that "all trial results are to be data centric" and that handwritten notes alone do not meet this requirement unless supported by corroborating evidence.
This regulatory and contractual shift has accelerated the adoption of digital solutions for DP assurance, such as GM DP Trials software, automated data capture, and centralized reporting platforms. The move toward data-centric trials aims to improve reliability, reduce human error, and allow results to be independently verified by charterers, class societies, or third-party experts all without necessarily requiring an attending surveyor on board, as long as the evidence is robust.

5. Regulatory requirements

Dynamic Positioning (DP) assurance is governed by a combination of class rules, industry guidelines, and client expectations. Over the past several years, these documents have increasingly emphasized the need for structured, verifiable, and data-driven evidence.

I. IMCA M 190 – Guidance Carrying Out Tests and Recording the Results

Section 5.9.1 outlines the minimum content required for each test, including:

- Test identification (e.g., test number)
- Reference to the DP FMEA item to be verified
- Test intention, prerequisites, and setup
- Method and actions to be performed (including relevant details such as breaker/fuse numbers)
- Expected results and acceptance criteria
- Space for actual observations and conclusions
- objective evidence should be provided for test results

Crucially, it concludes with: "**Objective evidence should be provided for test results."** This means each trial must be supported by independently verifiable data rather than subjective statements. Section 7 further supports the use of data-driven trials without an attending surveyor, provided the collected evidence is complete and robust.

II. OCIMF DP FMEA Assurance Framework (2020)

- Section 2.6 specifies that "all trial results, regardless of the method by which they were recorded, are to be data centric."
- It further clarifies that results recorded by manual means such as handwritten notes do not meet the intent of data-centric evidence unless supported by corroborating evidence such as screenshots, system logs, or alarm records.
- It explicitly states that test results described only with generic terms such as "as expected" are not considered corroborating evidence.

III. Class Society Requirements

- Class rules (e.g., DNV Pt.4 Ch.9, ABS DPS Guide, BV DYNAPOS) require verification of redundancy, fault tolerance, and Worst-Case Failure Design Intent (WCFDI) performance. Traditionally, the focus has been on witnessing tests in person rather than prescribing specific documentation requirements for each trial, as the attending class surveyor provides real-time verification.

- However, as digital reporting becomes more common, class surveyors are increasingly open to reviewing detailed records including timestamps, witness sign-offs, and supporting data to support testing process.

IV. Client and Charterer Expectations

Major charterers and operators now place strong emphasis on data-centric evidence, aligning with the OCIMF DP FMEA Assurance Framework. Vessel acceptance increasingly requires structured, auditable evidence packages containing time-stamped logs, screenshots, and system records.

As a result, reports with ambiguous or incomplete data or generic statements such as “as expected” are frequently rejected. This leads to repeat trials, additional surveyor time, and potential vessel off-hire. The commercial impact of weak evidence is significant, adding both cost and schedule risk for operators.

However, a balance must be struck. Full implementation of class-approved, fully data-centric solutions can be costly and operationally challenging, particularly for older vessels or those with limited digital integration capabilities. The focus should therefore be on capturing sufficient, verifiable evidence that meets OCIMF and charterer requirements, without imposing unnecessary economic burden.

Together, these regulatory and commercial drivers establish a clear expectation: DP trial evidence must be complete, structured, and verifiable, but solutions must remain practical and cost-effective for operators. The industry is moving toward digital, data-centric assurance — but with a pragmatic approach that balances compliance, reliability, and cost.

6. The Evidence Gap

Despite clear regulatory expectations, DP trial evidence remains inconsistent across the industry. Many vessels still rely on narrative-only reports or handwritten notes. These create several issues:

- **Incomplete Records:** Missing timestamps, sign-offs, or supporting data make it impossible to verify results during audits.
- **Variability:** Different surveyors, clients, and vessels apply different standards, resulting in inconsistent quality.
- **Risk of Rework:** Ambiguous evidence often may lead to charterer rejections, repeat trials, and vessel off-hire, driving up cost and delaying project schedules.

This “evidence gap” highlights the need for a more structured and repeatable approach.

7. Data-Centric Evidence as the Solution

Both **IMCA M 190** and the **OCIMF DP FMEA Assurance Framework** have made data-centric evidence a formal requirement. The goal is to ensure that any competent third party reviewing the results can reach the same conclusion as the original surveyor.

Key elements of data-centric evidence include:

- **Structured Templates:** Mandatory fields (timestamp, expected vs. observed result, witness sign-off, attachments) ensure completeness and prevent missing data.
- **Direct Log Imports:** Automatic upload of .CSV or .TXT files from DP systems, IAS, and power management systems eliminates manual transcription errors.
- **Metadata Tagging:** Automatic association of vessel name, trial ID, and event timestamps to every uploaded file ensures traceability.

- **Automatic Timestamp Synchronization:** Aligns events across multiple systems (DP logs, IAS alarms, manual crew inputs) into a single timeline for easy verification.

8. Triangulation in Practice

Robust evidence often comes from more than one source. **Triangulation** is the practice of combining at least two independent sources to validate a result. For example:

- **DP Operator Screen:** Confirms alarms, status changes, and DP mode during the test.
- **IAS Screen:** Shows breaker positions, generator loading, bus voltages, and alarm history.
- **Manual Lever Confirmation:** Verifies that physical actions were performed as per procedure.

This multi-source approach creates a defensible record that is much harder to dispute, particularly during charterer or class review.

9. The Role of the Surveyor

Digital tools are transforming DP assurance by providing structured logs, timestamps, and supporting media. These records create a second line of verification, making surveyor observations auditable, traceable, and easier for charterers, auditors, and class surveyors to review. Over time, aggregated data can be used not only to assess surveyor performance and training needs, but also for troubleshooting and detecting long-term changes in system behaviour across years of operation.

However, digital evidence is not a replacement for the surveyor. The surveyor's role remains indispensable, as they bring judgment, experience, and context that raw data alone cannot provide. Their responsibilities include:

- Detecting crew maloperation during testing.
- Recognizing unexpected behaviours in system responses.
- Interpreting results in context: for example,
- Crucially, the sharp eye of the attending surveyor can detect anomalies that fall outside the test script but still threaten safe operations.
- For instance, during load changes, a surveyor may notice that temperature controllers are too slow to respond, causing cooling water temperatures to approach alarm limits and risking a blackout. Such contextual insights demonstrate why the human element remains central to credible DP assurance.

IMCA M190 reinforces this role. The attending surveyor ensures that proving trials:

- Verify the findings of the DP FMEA and confirm that the vessel remains fault tolerant to its equipment class.
- Demonstrate that system changes have not introduced unexpected effects.
- Allow the crew to witness failure modes and operational configurations they may not otherwise encounter, strengthening competence and confidence.
- Provide opportunities for knowledge transfer, where an experienced third party explains system behaviours and mitigation responses.
- Build confidence with clients and charterers by ensuring the vessel's DP capability is demonstrated transparently.

Even in emerging practices such as cumulative testing, IMCA requires the use of class-approved digital data collection systems and assessment by an IMCA-accredited DP practitioner. This underscores that

while digitalization supports consistency and traceability, the independent judgment of the surveyor remains central to credible DP assurance.

10. Case Study: Avoiding Repeat Trials

During a recent DP proving trial, a charterer initially rejected a test result, claiming it had been carried out in a different mode than the CAM DP configuration. Traditionally, such a dispute would have required a repeat trial, resulting in vessel off-hire, project delays, and additional cost.

However, in this instance, data-centric evidence collected during the test including DP mode screenshots, event logs, and timestamps provided objective proof that the trial had in fact been executed correctly. The evidence package was shared with the charterer, who accepted the result without requiring a repeat trial.

This outcome avoided unnecessary rework, preserved the project schedule, and maintained client confidence, clearly demonstrating the value of structured, verifiable evidence in DP assurance.

11. Global Maritime's Implementation Plan

To institutionalize this approach, Global Maritime is implementing a structured roadmap:

- GM Evidence Checklist: A standardized minimum evidence requirement for every DP test.
- Mandatory DP App Validation: All trials are run through GM's DP App workflow, with automatic flagging of missing evidence before report submission.
- Internal Case Library: An anonymized database of real test cases to train surveyors and standardize evidence collection practices.
- Stakeholder Engagement: Active collaboration with charterers, operators, and class societies to align expectations and raise industry standards.

A crucial aspect of ensuring the efficacy of a DP Annual Trials programme is that it is clearly and succinctly written, with precise instructions, so that each task can be carried out in the same manner by different personnel.

Global Maritime has always supported smart, cost-effective solutions that improve safety to the ALARP (As Low As Reasonably Practicable) level. It is important to note, however, that not every vessel is suited to full digitalization. Older units, in particular, may lack sophisticated control and monitoring systems capable of producing reliable, automated, data-centric evidence. In such cases, the cost of implementing fully automated class-approved solutions would not be economically reasonable, and a more pragmatic balance between digital tools and traditional assurance methods is required.

This plan therefore aims to make DP assurance more reliable, efficient, and trusted, while ensuring that solutions remain practical and proportionate to vessel capability. In doing so, Global Maritime positions itself as a leader in digital DP verification, delivering assurance that is both technically robust and commercially realistic.

12. Conclusion

The transition from narrative-based reporting to data-centric evidence represents a fundamental shift in Dynamic Positioning (DP) assurance. Regulatory drivers such as IMCA M 190 and the OCIMF DP FMEA Assurance Framework make it clear that objective, verifiable data is now a minimum requirement.

This paper has shown that adopting structured templates, direct log imports, metadata tagging, and timestamp synchronization significantly improves the completeness, reliability, and traceability of DP trial results. By using triangulation — combining DP operator screens, IAS data, and manual confirmations we create robust records that withstand external scrutiny and reduce the need for costly repeat trials.

Importantly, data capture does not replace the surveyor but strengthens their role, providing a second line of verification and enabling performance assessment over time. The case study presented demonstrates how robust evidence prevented repeat testing, avoided vessel off-hire, and maintained client confidence.

Global Maritime's roadmap including a company-wide evidence checklist, DP App compliance validation, and internal case libraries ensures a consistent, repeatable approach to DP assurance. Together, these initiatives position GM as a leader in digital DP verification and contribute to a safer, more efficient, and more transparent offshore industry.

13. Acknowledgements

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Finally, we wish to thank the software development team behind the GM DP App for enabling direct log integration, automated metadata tagging, and timestamp synchronization key elements that made this transition to data-centric assurance practical and efficient.

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