[CLIENT/LOGO]

[VESSEL]

HULL No.: [IF AVAILABLE]  
IMO#: XXXXXXX

Dynamic Positioning

ANNUAL TRIALS   
**[DATE OF TRIALS]**

✠[OTHER INFORMATION HERE, FOR EXAMPLE]  
[CLASS NOTATION OR SIMILAR]

|  |  |  |  |
| --- | --- | --- | --- |
| Doc. Title | **[VESSEL NAME] Annual DP Trials** | **Aluciant Ref.** | **ALU-[JOB]-[Insp.]-RXX** |
| Client Ref. |  | **Template Rev.** | **ALUH-DPTrials-Rev.1** |
| Distribution List |  | | |

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****SUMMARY****

**Doc. No.**

ALU-XXXXXX-XXX-XX Rev.X

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**Aluciant**

Address

Phone

**www.aluciant.com**

Aluciant, LLC were instructed by [CLIENT] of [COMPANY] to create and witness the DP Annual Trials Program of the [VESSEL] at [LOCATION]

[INSPECTOR] attended the vessel at [LOCATION]. The trials were conducted around a position of XX˚ XX”XX’ N/S XXX˚ XX”XX’ E/W on the [DATE] in accordance with the annual trials document.

All trials were coordinated by the vessels Master or his nominee and witnessed by [INSPECTOR] of Aluciant.

On the basis of the trials results, the vessel ***[IS OR IS NOT]*** considered fit to carry out operations equivalent to IMO DP Equipment Class [1, 2 OR 3](as assigned by class) within its defined operating limits when the DP system is configured as tested during trials and noted in section 2.12 of this report until the category A finding(s) described in section 4.2of this report are closed out to Aluciant’s satisfaction. ***[--Delete the highlighted red test if no Cat-A findings, or change to black if there are--]***

Although the trials program has been developed for the vessel owner / operator, it is essential that the program itself be owned by the vessel and form part of its safety management systems and be subject to the vessel owner’s / operator’s procedures for control and amendment of such documents.

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Standard Abbreviations List

|  |  |
| --- | --- |
| ABB | ASEA Brown Boveri |
| ABS | American Bureau of Shipping |
| AC | Alternating Current |
| ACU | Air Conditioning Unit |
| AHU | Air Handling Unit |
| AHV | Anchor Handling Vessel |
| AMS | Alarm Management System |
| ASOG | Activity Specific Operating Guidelines |
| AVC | Automatic Vessel Control system |
| AVR | Automatic Voltage Regulator |
| BV | Bureau Veritas |
| BT | Bow Thruster |
| BTT | Bow Tunnel Thruster |
| CAM | Critical Activity Mode |
| CAN | Control Area Network |
| CB | Circuit Breaker |
| CCR | Central Control Room |
| CCTV | Closed Circuit Television |
| CCW | Counter Clockwise |
| CMF | Common Mode Failure |
| CPP | Controllable Pitch Propeller |
| CPU | Central Processing Unit |
| CW | Cold/Cooling Water or Clockwise |
| DC | Direct Current |
| DG | Diesel Generator |
| DGNSS | Differential Global Navigation Satellite System |
| DGPS | Differential Global Positioning System |
| DNV | Det Norske Veritas |
| DP | Dynamic Positioning |
| DPC | Dynamic Positioning Controller |
| DPO | Dynamic Positioning Operator |
| DPS | Dynamic Positioning System |
| DSC | Digital Speed Controller |
| ECR | Engine Control Room |
| ECU | Engine Control Unit |
| EG | Emergency Generator |
| EPDB | Emergency Power Distribution Board |
| ER | Engine Room |
| ESB | Emergency Switchboard |
| ESD | Emergency Shutdown |
| ETA | Estimated Time of Arrival |
| ETD | Estimated Time of Departure |
| F&G | Fire and Gas |
| FMEA | Failure Mode and Effects Analysis |
| FMECA | Failure Mode, Effects and Criticality Analysis |
| FO | Fuel Oil |
| FS | Field Process Station |
| FSVAD | Flag State Verification and Acceptance Document |
| FW | Fresh Water |
| Fwd | Forward |
| G | Generator |
| GCB | Generator Circuit Breaker |
| GCP | Generator Control Panel |
| GPS | Global Positioning System |
| GVR | Generator Voltage Relay |
| H | High |
| HF | High Frequency |
| HH | High High |
| HIL | Hardware in the Loop |
| HMI | Human Machine Interface |
| HO | Heavy Oil |
| HPR | Hydro acoustic Position Reference |
| HPU | Hydraulic Power Unit |
| HT | High Temperature |
| HV | High Voltage |
| HVAC | Heating, Ventilation & Air Conditioning |
| I/O | Input/Output |
| IAS | Integrated Automation System |
| ICMS | Integrated Control & Monitoring System |
| IEEE | Institute of Electrical and Electronic Engineers |
| IJS | Independent Joystick System |
| IMCA | International Marine Contractors Association |
| IMO | International Maritime Organization |
| IP | Internet Protocol |
| KFDD | Kongsberg Functional Design Document |
| KM | Kongsberg Maritime |
| KR | Korean Registry |
| kVA | Kilo Volt Ampere |
| kVAr | Kile Volt Ampere Reactive |
| kW | Kilo Watts |
| L | Low |
| LAN | Local Area Network |
| LBL | Long Base Line |
| LED | Light Emitting Diode |
| LL | Low Low |
| LO | Lube Oil |
| LOP | Loss of Position |
| LR | Lloyds Register |
| LT | Low Temperature |
| LUSBL | Long Ultra Short Base Line |
| LV | Low Voltage |
| mA | Milliamps |
| MCB | Main Circuit Breaker |
| MCC | Motor Control Center |
| MF | Medium Frequency |
| MGPS | Marine Growth Protection System |
| MMI | Man Machine Interface |
| MMS | Marine Management System |
| MR | Multiple Reference |
| MRU | Motion Reference Unit |
| MSB | Main Switchboard |
| MSC | IMO Maritime Safety Committee |
| MTBF | Mean Time Between Failures |
| MTS | Marine Technology Society |
| MUX | Multiplexer |
| MV | Medium Voltage |
| MVAr | Mega Volt Ampere reactive |
| MW | Mega Watts |
| NI | Nautical Institute |
| NDE | Non Drive End |
| NE | Normally Energized |
| NET | Network |
| NFU | Non Follow Up |
| NIC | Network Interface Cards |
| NORSOK | Norwegian Technology Standards Institution |
| OIM | Offshore Installation Manager |
| OICNW | Officer In Charge of Navigational Watch |
| OR | Open Relay |
| OR&R | Observe Results and Restore |
| OS | Operator Station |
| OSV | Offshore Support Vessel |
| OR | Observe Results |
| OR&R | Observe Results and Restore |
| OT | Operator Terminal |
| (P) | Port Side |
| PA | Public Address or Power Available |
| PC | Personal Computer |
| PCI | Peripheral Controller Interface |
| PDB | Power Distribution Board |
| PLC | Programmable Logic Controller |
| PM | Planned Maintenance |
| PMS | Power Management System |
| PRS | Position Reference System |
| PSU | Power Supply Unit |
| PSV | Platform Supply Vessel |
| PX | Position |
| QC | Quick Closing |
| QCV | Quick Closing Valve |
| RCS | Remote Control System |
| RCU | Remote Controller Unit |
| RIO | Remote Input/Output |
| ROV | Remote Operated Vehicle |
| RPM | Revolutions Per Minute |
| (S) | Starboard Side |
| SBC | Single Board Computer |
| SBL | Short Base Line |
| SCE | Safety Critical Element |
| SDPO | Senior Dynamic Positioning Operator |
| SG | Specific Gravity |
| SIMOPS | Simultaneous Operations |
| SMO | Safest Mode of Operation |
| SMS | Safety Management System |
| SNMP | Simple Network Management Protocol |
| STCW | International Convention on Standards of Training Certification & Watchkeeping for Seafarers |
| SW | Sea Water |
| Swbd | Switchboard |
| T | Thruster |
| TAGOS | Thruster and Generator Operating Strategy |
| TAM | Task Appropriate Mode |
| TC | Thruster Control |
| TCP IP | Transmission Control Protocol / Internet Protocol |
| TCU | Thruster Control Unit |
| TTT | Time To Terminate |
| U/V | Under Voltage |
| UHF | Ultra High Frequency |
| UMS | Unmanned Machinery Space |
| UPS | Uninterrupted Power Supply |
| USBL | Ultra Short Base Line |
| USCG | United States Coast Guard |
| Var | Volt Ampere Reactive |
| VDU | Visual Display Unit |
| VFD | Variable Frequency Drive |
| VHF | Very High Frequency |
| VMS | Vessel Management System |
| VRU | Vertical Reference Unit |
| VSD | Variable Speed Drive |
| WCF | Worst Case Failure |
| WCFDI | Worst Case Failure Design Intent |
| WSOG | Well Specific Operating Guidelines |

Trials Preparation & SCOPE

* 1. Introduction

Aluciant were instructed by [NAME] of [COMPANY] to witness a DP Annual Trials on board the [VESSEL], which is operated by [COMPANY].

[INSPECTOR], of Aluciant attended the vessel at [LOCATION] between the [DATE] and [DATE] with the trials taking place [LOCATION].

* 1. Scope of Work

The annual trials program has been developed from the FMEA of the vessel’s DP system and all related equipment. The trials are intended to show that the vessel meets the requirements of IMCA M 103 – Guidelines for the design and operation of dynamically positioned vessels, the IMO Guidelines for Vessels and Units with Dynamic Positioning (DP) Systems 2017 (MSC 1580) and [**relevant classification society name and rules reference, e.g. Lloyd’s Register Rules and Regulations for the Classification of Ships, Part 7 Chapter 4 – Dynamic Positioning Systems BE SPECIFIC PLEASE**].

This trials document is prepared based on the guidelines incorporated in:

* + - * [ADD OR REMOVE ITEMS HERE AS NECESSARY]
      * ABS guide for Dynamic Positioning Systems – July 2014 consolidated edition
      * IMCA M109 – A guide to DP-related documentation for DP vessels – June 2016, Rev.2
      * IMCA M190 - Guidance for Developing and Conducting Annual DP Trials Programmes for DP Vessels – March 2017, Rev.1
      * MTS TECHOP\_ODP\_08\_(O) - ANNUAL DP TRIALS AND GAP ANALYSIS – September 2014
      * IMO Guidelines for Vessels and Units with Dynamic Positioning (DP) Systems – Maritime Safety Committee (MSC) Circular 1580. (MSC.1/Circ. 1580 - 16 June 2017)

The scope of work included:

* + - * Preparation of DP Annual Trials program from previous documentation and discussion with master and chief engineer.
      * Witness the trials and report any findings.
      * Produce a final report for the DP Annual Trials.

The trials were intended to verify:

* + - * Vessels’ DP station keeping using various PRS combinations.
      * Vessels’ DP maneuverability using various PRS combinations.
      * Ability to maintain position / heading after worst-case failures have been applied.
      * Validity of the FMEA currently on board.
      * Test any new equipment or system upgrades and ensure they are implemented into the DP trials schedule.

IMO MSC/Circ.1580 states that:

*An annual survey should be carried out within three months before or after each anniversary date of the Dynamic Positioning Verification Acceptance Document. The annual survey should ensure that the DP system has been maintained in accordance with applicable parts of the guidelines and is in good working order. The annual test of all important systems and components should be carried out to document the ability of the DP vessel to keep position after single failures associated with the assigned equipment class and validate the FMEA and operations manual. The type of tests carried out and results should be recorded and kept on board.*

* 1. Conduct of Work

[INSPECTOR], Marine Consultant with Aluciant, witnessed the DP Annual Trials, which are shown in Appendix B, and noted relevant results, alarms and printouts of various tests and disconnections as required.

Trials commenced at approximately [TIME] [DATE] and were completed at approximately [TIME] [DATE].

The trials were carried out at [POSITION]. The water depth at the location was around [DEPTH]

Weather conditions at the time of the trials were:

* + - * Wind: [SPEED] from [DIRECTION]
      * Waves (including swell): [Meters or Feet]
      * Current: [SPEED] [DIRECTION]
  1. Key personnel onboard for trials:

|  |  |  |
| --- | --- | --- |
| **Name** | **Discipline** | **Company** |
|  | Captain |  |
|  | Chief Officer |  |
|  | 1st Officer |  |
|  | 2nd Officer |  |
|  | Chief Engineer |  |
|  | 1st Engineer |  |
|  | 2nd Engineer |  |
|  | 4th Engineer |  |
|  | Electrician |  |
|  | Asst. Electrician |  |
|  | DP Technician |  |
|  | DP Trials witness | Aluciant |

* 1. DP Operator details:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Captain** | **SDPO** | **SDPO** |
| **Name:** |  |  |  |
| STCW ’95 License |  |  |  |
| DP Cert. Type |  |  |  |
| DP Cert. No. |  |  |  |
| DP Cert. Expiry |  |  |  |
| DP Training Center |  |  |  |
| DP Experience Total |  |  |  |
| DP Experience V/L |  |  |  |
| DP Log book updated |  |  |  |
|  | **JDPO** | **JDPO** | **Trainee** |
| **Name:** |  |  |  |
| STCW ’95 License |  |  |  |
| DP Cert. Type |  |  |  |
| DP Cert. No. |  |  |  |
| DP Cert. Expiry |  |  |  |
| DP Training Center |  |  |  |
| DP Experience Total |  |  |  |
| DP Experience V/L |  |  |  |
| DP Log book updated |  |  |  |

* 1. DP Engineer / Electrician details:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Chief Eng.** | **1st Eng.** | **2nd Eng.** |
| **Name:** |  |  |  |
| STCW ’95 License |  |  |  |
| DP Maint. Cert. |  |  |  |
| DP Cert. Issued |  |  |  |
| DP Training Center |  |  |  |
| DP Experience Total |  |  |  |
| DP Experience V/L |  |  |  |
| DP Log book updated |  |  |  |
|  | **Electrician** | **ETO** | **Other** |
| **Name:** |  |  |  |
| STCW ’95 License |  |  |  |
| DP Maint. Cert. |  |  |  |
| DP Cert. Issued |  |  |  |
| DP Training Center |  |  |  |
| DP Experience Total |  |  |  |
| DP Experience V/L |  |  |  |
| DP Log book updated |  |  |  |

During the trials, all DP critical equipment was available and in use. **[OR NOT?]**

The trials included a review of the documentation and records related to the maintenance history of the vessel. See Appendix A. This should give an indication that all DP related systems are adequately maintained. It should also demonstrate that the vessel is maintained and operated by competent staff, backed-up by shore-based management experienced in the operation of DP vessels.

The surveyor carrying out the next annual trial should be first satisfied that all the outstanding items from the previous trial have been addressed and where necessary reschedule the tests to ensure that where problems may have arisen in previous trials, adequate retesting is completed during the current or future DP annual trials.

* 1. Purpose of FMEA DP Proving Trials

The purpose of the FMEA DP proving trials is to assess the performance of the vessel and crew in relation to IMCA and IMO guidelines for DP vessels. Also, to prove the accuracy of drawings, installation, the as-built systems and the desk-top FMEA.

* 1. Purpose of the DP Annual Trials

The purpose of the DP Annual Trials is to ensure the crew maintains the vessel operationally to the IMCA and IMO guidelines for DP vessels. As the accuracy of drawing, installation and as-built systems have already been assessed in the FMEA DP Proving Trials; some tests will not be required to be completed again whilst no major changes have been made to the vessel systems or equipment.

* 1. Scope of DP Assessment

The scope of DP assessment includes major items of equipment associated with power generation, power distribution, propulsion and thruster command and feedback signal loops as well as those items associated with the independent joystick and DP systems.

* 1. Rules of Testing

The [-- [CLIENT] or [VESSEL OPERATOR] INSERT AS APPROPRIATE--] will appoint a trials coordinator to schedule the necessary resources and organize the conduct of the trials program. This must not be the witness.

During the trials all relevant shipboard equipment is required to be fully operational. In particular, all propulsion units and their controls, both manual and automatic, all power generation equipment, all computer systems and all position reference systems must be fully functional, including their alarms, standby units, battery backups, shutdowns, trips etc.

All trials will be conducted with the approval of the Master and with full regard to the safe navigation of the vessel.

The trials co-coordinator (not the Surveyor / Witness) will satisfy themselves by whatever means necessary that a test can be conducted safely and any test that cannot be conducted safely will be cancelled – A suitable and sufficient risk assessment should also be carried out by the vessel’s staff for any tests where there is a risk of equipment damage even if that test can be conducted safely – An unsatisfactory outcome will be assumed for any test cancelled on the grounds of safety or equipment damage until proven otherwise.

Unless otherwise stated all tests will be carried out on full DP in realistic environmental conditions or with some varying load on the system induced by movements of the vessel.

During the trials, the vessel’s staff will assist as required in recording alarms and failures locally. Locally means not only at the DP console but also at the ECR, thruster rooms etc.

Following failure tests, the system must not be restarted until the DP operators, ECR staff and witnesses are satisfied they understand the full effects of the failure and that all the information or indicators that show what has occurred have been noted.

When reinstating systems after failure simulations, it must be ensured that all equipment has been configured correctly, breakers reset, power supplies re-established and cables reconnected. Only when everyone is satisfied that the system has been reset and has stabilized will the trials continue.

If there are any doubts about a test it will be repeated. If test results are unexpected, then the test will also be repeated. It should be noted that seemingly small or spurious faults in DP control systems may be the first manifestations of a more serious problem.

Tests will proceed only when all those involved have been informed and (where necessary) suitable communications have been set up, e.g. DP console to thruster room.

The tests will not only prove hardware redundancy and DP capability after failures but also that the operators have the necessary training and experience to use the system and deal successfully with such failures.

When reinstating systems after failure simulations, two persons will check that any circuit breakers, pump settings, automatic shutdowns etc. have been properly reset. Any mistake in resetting or the configuration of the system may lead to additional failures in excess of the designed limits which could delay the trials schedule.

Vessel Particulars

* 1. General

The [VESSEL] is of all steel welded construction with the accommodation forward and the engine room below. The vessel was delivered in [DATE] and classed by [CLASS SOCIETY] with notation 600px-Maltese-Cross-Heraldry_svg.png 1A1, E0, DYNPOS-AUTRO, DP-3 etc.

The vessel is of diesel electric design / all diesel? [DESCRIPTION]

Propulsion and positional thrust is supplied by [DESCRIPTION]

* 1. Vessel Profile

[IF AVAILABLE enter picture here]

* 1. One-Line Drawing / Redundancy Concept

[IF AVAILABLE enter picture here]

* 1. Principal Dimensions
     + - Length overall: [METERS]
       - Breadth moulded: [METERS]
       - Normal operating draft: [METERS]
       - Maximum operating draft: [METERS]
  2. Special Equipment
     + - Integrated Saturation Dive Spread
       - Helideck
       - ROV
       - 250t Knuckle boom crane
       - Stores crane
       - ETC
  3. Power Generation

Each of the two engine rooms / the engine room contain the following:

* + - * Main Engines: 1x 2000kW
      * Auxiliary generators: 2x 1500kW
      * ETC
  1. Thrusters

The thruster and propulsion consist of:

* + - * Bow azimuth thruster: 1500kW
      * Bow tunnel thrusters: 2x 1500kW
      * Stern azimuth thrusters: 2x 2000kW
  1. Vessel Management System

The vessel has a robust management system on board, with a computerized planned maintenance system [VERSION] and full SMS covering all aspects of the marine operations carried out on board.

* 1. DP Control System & Reference Sensors

The vessels’ main DP control system is a [MANUFACTURER] interfaced to the following:

|  |  |
| --- | --- |
| **Sensor** | **Make & Model / Remarks** |
| DP System |  |
| Independent Joystick |  |
| Gyro #1 |  |
| Gyro #2 |  |
| Gyro #3 |  |
| MRU #1 |  |
| MRU #2 |  |
| MRU #3 |  |
| Wind Sensor #1 |  |
| Wind Sensor #2 |  |
| Wind Sensor #3 |  |
| DGPS #1 |  |
| DGPS #2 |  |
| Laser Range / Bearing |  |
| Radar Based Reference |  |
| Hydro-Acoustic |  |
| Light Weight Taut-Wire |  |
| Other |  |

* 1. FME(C)A [--Delete the C if not a FMECA, and delete this comment--]

The vessel FME(C)A was noted as being completed [DETAILS]

The FMEA has / has not been approved by [CLASS]

* 1. System Upgrades & Modifications

The vessel was purpose built as a dive vessel / construction / or converted on [DATE]

No major system upgrades or modifications have been reported as carried out in the previous year.

* 1. Machinery Configuration During Trials

The vessel must be operated with an open / closed 690v bus-tie to adhere to the criteria for a redundant system as per the IMO requirements.

All thrusters should be running and available for selection into the DP control.

A minimum of three position reference sensors should be available and selected where possible.

Unless otherwise noted in the tests the vessel was operated throughout the trials with an open / closed bus-tie, the ENGINE as preferred units and No.1 Bow Thruster supplied from the starboard side bus.

NOTE OTHER REQUIREMENTS FOR DP OPERATIONS TO ENSURE REDUNDANCY OF SYSTEMS based on DP OPERATIONS MANUAL or similar

* 1. Worst Case Failure Design Intent

The FMEA defines the worst case design intent (WCFDI). The worst case failures will be tested at trials and are reported to be [STATE WHAT IT IS HERE] leading to loss of [EQUIPMENT].

Redundancy groups are / are not identified in the FMEA as a conventional 50% split. This will be verified on site relating to operating with both open and closed bus configurations.

Configurations for CAM and TAM operations are not specifically identified in the FMEA. The plant is to be configured for critical applications with all machinery available and XXXv bus tie open / closed.

* 1. Critical Activity Mode Configuration

If the CAM is not detailed in the FMEA or Operations Manual state so here

-- OR --

For critical activities the vessel should be set with the following:

Generators and Thrusters

* + - * All diesel generators running and online
      * All thrusters running and online
      * Emergency generator in auto standby mode

Circuit Breakers and valves

* + - * 930V DC Bus Tie breaker open
      * 440V AC Bus Tie breaker open
      * 230V AC Bus Tie breaker open
      * 440V ESB supplied by 440V MSB 1
      * Fuel oil Crossover valves closed
      * Lubricating crossover valves closed
      * Cooling water crossover valves closed
  1. Task Appropriate Mode

If the TAM is not detailed in the FMEA or Operations Manual state so here

-- OR --

For activities where a task appropriate approach can be taken with full risk analysis, the vessel should be set with the following:

Generators and Thrusters

* + - * At least two (2) diesel generators running and online (DG#1 or #2 and DG#3 or #4)
      * All thrusters running and online
      * Emergency generator in auto standby mode

Circuit Breakers and valves

* + - * 930V DC Bus Tie breaker closed
      * 440V AC Bus Tie breaker open
      * 230V AC Bus Tie breaker open
      * 440V ESB supplied by 440V MSB A
      * 24V DC bus tie breakers open
      * Fuel oil Crossover valves closed
      * Lubricating crossover valves closed
  1. Vessel DP Capability

The DP capability plot details are shown in appendix A. [or statement regarding capability plots. Include when last updated or verified against real world experience.]

Conclusion & Comments From Trials

1. 1. Conclusions

On the basis of the trials results, the vessel is considered fit to carry out operations equivalent to IMO DP Equipment Class [1, 2 OR 3](as assigned by class) within its defined operating limits when the DP system is configured as tested during trials and noted in section 2.12 of this report once the category A finding(s) described in section 4.2of this report are closed out to the satisfaction of Aluciant. ***[--Delete the highlighted red text if no Cat-A findings, or change to black if there are--]***

The [VESSEL] was seen to be well maintained with a knowledgeable and dedicated crew who were fully aware of the operation and failure modes of the systems as installed on board.

* 1. Documentation, Maintenance and Station Keeping Events

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

The presented annual trials normally begin with a review of documentation related to the maintenance history of the vessel. This provides evidence that all DP related systems are adequately maintained. It also demonstrates that the vessel is maintained by competent staff, backed up by shore-based management experienced in the operation of DP vessels.

* 1. Power Generation

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

The tests successfully demonstrated power generation, load sharing and shedding to be fully effective. Each generator was demonstrated as being able to deliver full power.

* 1. Power Distribution

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

The tests successfully demonstrated the power distribution redundancy with the bus-tie open / closed.

* 1. Power Management

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

Tests were carried out to ensure every generator could take full load limitation to prevent blackout is provided by the DP system and also by the main switchboard and engine management systems. Both systems were tested successfully. Auto start of standby generators on rising demand was successfully demonstrated, along with auto stop on falling demand after a start.

* 1. Control Loops

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

Control loops for the thrusters (command & feedback) were tested between the DP system and the thruster control cabinets and between the control cabinets and the thrusters. They were found to fail safely in accordance with the vessel FMEA and appropriate guidelines for DP vessels.

* 1. Environmental & Heading Sensors

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

All sensors were successfully tested under normal and failed conditions.

* 1. Position References

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

All systems were tested satisfactorily and demonstrated to be operational following failure of both DP control computers.

* 1. DP Control

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

The results of the tests on the DP control system were satisfactory. The independent joystick was also tested and demonstrated to be operational following failure of both DP control computers.

* 1. Personnel

[THIS IS A SAMPLE SENTENCE. PLEASE FORMULATE YOUR OWN IN THIS SPACE PER THE TESTING CARRIED OUT]

The vessel crew who carried out the tests were found very capable and showed a very good understanding of the systems as installed on board. They were willing and keen to conduct the trials and take advantage of the learning opportunity that the trials provided.

Findings

1. 1. Explanation

Findings are grouped into three categories: (Based on IMCA M190)

* + - * Category A - The redundancy concept is no longer fully fault tolerant. Fault tolerance should be restored.
      * Category B - The redundancy concept is fully fault tolerant at reduced environmental limits. The vessel’s post failure DP capability should be redefined or full capability restored.
      * Category C - The redundancy concept is fully fault tolerant but an element of non-critical redundancy is unavailable.

-- OR – [--DELETE WHICH YOU DO NOT WANT – Above from IMCA below from MTS--]

Findings are grouped into three categories: (Based on IMCA M191)

|  |  |  |
| --- | --- | --- |
| **Category A** | **Category B** | **Category C** |
| **For Immediate Attention** | **For action when Reasonably Convenient** | **For future Consideration** |
| The redundancy concept is no longer fully fault tolerant. Fault tolerance should be restored. | The redundancy concept is fully fault tolerant at reduced environmental limits. The vessel’s post failure DP capability should be redefined or full capability restored. | The redundancy concept is fully fault tolerant but an element of non-critical redundancy is unavailable. |
| The failure effect exceeds the worst case failure design intent | The failure effects are more severe than expected but do not exceed the worst case failure design intent. | The results are ‘as expected’ but there is an opportunity to reduce the severity of failure effects at reasonable cost |
| Any test resulting in loss of position or heading excursion > greater than defined limits - typically 3m and/or 3° |  | There is an opportunity to improve DP safety and reliability at reasonable cost |
| Any non-compliance with class DP rules for the relevant notation |  |  |
| Pre-existing fault - Any fault found during trials that disables the redundancy concept such that WCFDI would be exceeded should another fault occur. e.g. faulty protection or auto changeover |  |  |
| Any faulty alarm required to initiate operator intervention on which the redundancy concept depends e.g. SW low pressure alarm |  |  |
| Any missing or faulty alarm required to reveal a hidden failure where periodic testing is not a credible alternative |  |  |

Findings from previous annual trials which have not been closed out at the conclusion of these trials are to be included with the original date of the finding.

* 1. Findings – Category A

There are no Category A findings arising from the trials held on [DATE]

--- OR ---

Test No. X – Something happened when it shouldn’t have

* 1. Findings – Category B

There are no Category B findings arising from the trials held on [DATE]

--- OR ---

Test No. X – Something happened when it shouldn’t have.

* 1. Findings – Category C

There are no Category C findings arising from the trials held on [DATE]

--- OR ---

Test No. X – Something happened when it shouldn’t have.

* 1. Observations

Items arising from these trials which should be considered for updating the FMEA, or items recorded here that do not fit into categories A, B or C.

* 1. Items Open from Previous Annual Trials

The following items are considered to remain open following review of the previous DP Annual trials report and associated close-out documentation.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Ref.** | **Test No.** | **Finding** | **Category** | **Closed out during trials** | **Not closed out – Add to this year’s findings** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Maintenance Status

* 1. Propulsion & Thrusters

|  |  |  |  |
| --- | --- | --- | --- |
|  | Thruster 1 | Thruster 2 | Thruster 3 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Last Oil Analysis (Date) |  |  |  |
| Last Oil Analysis Results |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul |  |  |  |
| Next Overhaul Planned |  |  |  |
|  | Thruster 4 | Thruster 5 | Thruster 6 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Last Oil Analysis (Date) |  |  |  |
| Last Oil Analysis Results |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul |  |  |  |
| Next Overhaul Planned |  |  |  |
| **Remarks:** | | | |

* 1. Diesel Thruster Power Units

|  |  |  |  |
| --- | --- | --- | --- |
|  | Thruster 1 | Thruster 2 | Thruster 3 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Last Oil Analysis (Date) |  |  |  |
| Last Oil Analysis Results |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul |  |  |  |
| Next Overhaul Planned (Hours / Date) |  |  |  |
|  | Thruster 4 | Thruster 5 | Thruster 6 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Last Oil Analysis (Date) |  |  |  |
| Last Oil Analysis Results |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul (Hours / Date) |  |  |  |
| Next Overhaul Planned (Hours / Date) |  |  |  |
| **Remarks:** | | | |

* 1. Generators

|  |  |  |  |
| --- | --- | --- | --- |
|  | Engine 1 | Engine 2 | Engine 3 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Last Oil Analysis (Date) |  |  |  |
| Last Oil Analysis Results |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul |  |  |  |
| Next Overhaul Planned (Hours / Date) |  |  |  |
|  | Engine 4 | Engine 5 | Engine 6 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Last Oil Analysis (Date) |  |  |  |
| Last Oil Analysis Results |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul (Hours / Date) |  |  |  |
| Next Overhaul Planned (Hours / Date) |  |  |  |
| **Remarks:** | | | |

* 1. Other Power Sources

|  |  |  |  |
| --- | --- | --- | --- |
|  | Batt. Bank 1 | Batt. Bank 2 | Batt. Bank 3 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Cycles Completed |  |  |  |
| Total percentage remaining |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul |  |  |  |
| Next Overhaul Planned (Hours / Date) |  |  |  |
|  | Batt. Bank 4 | Batt. Bank 5 | Batt. Bank 6 |
| Maintenance Records Checked | ✓ | ✓ | ✓ |
| Outstanding Maintenance |  |  |  |
| Cycles completed |  |  |  |
| Total percentage remaining |  |  |  |
| Running Hours (Present) |  |  |  |
| Last Overhaul (Hours / Date) |  |  |  |
| Next Overhaul Planned (Hours / Date) |  |  |  |
| **Remarks:** | | | |

* 2. Switchboard Maintenance

|  |  |
| --- | --- |
| **Main Switchboard:** | Contractor name. Date. Report Number. Planned Maintenance |
| **480V Switchboard:** | Contractor name. Date. Report Number. Planned Maintenance |
| **230V Switchboard:** | Contractor name. Date. Report Number. Planned Maintenance |
| **Emergency Switchboard:** | Contractor name. Date. Report Number. Planned Maintenance |
| **Generator Breakers:** | Contractor name. Date. Report Number. Planned Maintenance |
| **Thruster Breakers:**. | Contractor name. Date. Report Number. Planned Maintenance |
| **Transformers:** | Contractor name. Date. Report Number. Planned Maintenance |
| **Modifications Since Last Trials:** |  |
| **Remarks:** | |

* 1. DP Sensors & Position References

|  |  |  |
| --- | --- | --- |
| **Sensor** | **Records Checked** | **Remarks (Include software revision if applicable)** |
| Gyros | ✓ |  |
| MRU’s | ✓ |  |
| Wind Sensors | ✓ |  |
| Acoustic PRS | ✓ |  |
| Taut Wire | ✓ |  |
| DGPS’s | ✓ |  |
| RADius | ✓ |  |
| FanBeam | ✓ |  |
| RadaScan | ✓ |  |
| CyScan | ✓ |  |
| Other | ✓ |  |
| **Remarks:** | | |

* 1. DP Computers, Controllers & IJS

|  |  |
| --- | --- |
| Maintenance checked | ✓ |
| Last System software revision |  |
| Configuration version |  |
| Marine Human Machine Interface |  |
| IJS System (Manufacturer, Model and Software) |  |
| **Remarks:**  **NOTE ANY SOFTWARE UPDATES FROM PREVIOUS TRIALS AND NOTE THE CHANGES** | |

* 1. Uninterrupted Power Supplies

|  |  |
| --- | --- |
| Maintenance Record DP UPS 1 | ✓ |
| Maintenance Record DP UPS 2 | ✓ |
| Maintenance Record IAS UPS 1 | ✓ |
| Maintenance Record IAS UPS 2 | ✓ |
| **Remarks:** | |

* 1. DP Documentation

|  |  |
| --- | --- |
| **FMEA & Proving Trials** |  |
| Last FMEA Revision & Date: | Revision No. Dated dd-MMM-yyyy |
| Proving Trials Revision & Date: |  |
| Class Approved? | Stamped by class? |
| All Findings Closed Out? |  |
| **Previous Annual DP Trials** |  |
| Report Revision & Date: |  |
| All Findings Closed Out? | Yes / No |
| Any open findings been Included in the relevant section of this report? (4.6) | Yes / No |
| **Vessel Specific DP Operations Manual** |  |
| Mobilization Trials | State version No. |
| Field Arrival Trials | State version No. when required etc. |
| Location Checklists | State version No. when required etc. |
| Bridge / Engine Room routine checklists | State version No. When required etc. |
| DPO Familiarization Requirement | State method. |
| DP Log Book up to date? |  |
| IMCA / MTS Guidance Available? |  |
| Service receipts / Vendor attendance reports: |  |
| **Remarks:** | |

* 1. Hardware Modifications

|  |  |
| --- | --- |
| Any modifications since last annual trials? |  |
| Have modifications been thoroughly tested? |  |
| Have annual trials procedures been updated? |  |
| Has the vessels DP FMEA been updated? |  |
| **Remarks:** | |

* 1. Capability & Footprint Plots

|  |  |  |
| --- | --- | --- |
| Are the correct capability plots onboard?  *(Plots should include the intact state and post worst-case failure state as a minimum (IMCA M103))* | ✓ | |
| Are there verifying footprints onboard? | ✓ | |
| Document available capability plots below: |  | |
| **Thrusters online** | **Current** | **Limiting wind & Direction** |
| Case 1: |  |  |
| Case 2: |  |  |
| Case 3: |  |  |
| Case 4: |  |  |
| Case 5: |  |  |
| Case 6: |  |  |
| Case 7: |  |  |
| Case 8: |  |  |
| Case 9: |  |  |
| Case 10: |  |  |
| **Remarks:** | | |

* 1. DP Station Keeping Events

|  |  |
| --- | --- |
| Have any events been recorded?  (Events may be recorded using the IMCA reporting format or the companies own reporting process.) |  |
| If Yes, Number of incidents: |  |
| Is there documented a satisfactory explanation? Give details if appropriate |  |
| **Remarks:** | |

* 1. Pre-Trials Checks / Setup Verification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Position Error Warning and Alarm | Warning: |  | Alarm: |  |
| Heading Error Warning and Alarm | Warning: |  | Alarm: |  |
| Gyro Alignment |  | | | |
| VRU Alignment |  | | | |
| Wind Sensor Calibration |  | | | |
| Consequence Analysis Active | State status as set (class 2 or 3?) | | | |
| DP Alarm Printer Operational and Tested |  | | | |
| Generator / Thruster Configuration |  | | | |
| Switchboard Configuration |  | | | |
| Fuel System split |  | | | |
| Thrusters Online |  | | | |
| DP Gain set |  | | | |
| DP Speed set |  | | | |
| Rate of turn set |  | | | |
| Vessel draft during trials |  | | | |
| Software options fitted | [Auto Pilot, follow sub etc.] | | | |
| **Remarks:** | | | | |

Sub-System Tests – Power System

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. High Voltage Systems (Main Bus-Tie) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. Partial Black Out | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. Low Voltage Distribution (First Step-Down 440V) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. Low Voltage Distributions (Second Step-Down 230V) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. Emergency Power | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. 24Vdc – Battery & UPS Systems & Distribution | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. IAS / PMS – UPS Systems & Distribution | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. DP – UPS Systems & Distribution | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Sub-System Tests – Machinery System

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. Diesel Engines / Diesel Generator Sets | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Fuel Oil System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Lubrication Oil System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Seawater Cooling System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Freshwater Cooling System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Compressed Air System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Engine Room Ventilation | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Sub-System Tests – Thruster System

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| * 1. Thruster Control System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Thruster Hydraulic System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Thruster Cooling System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Control Mode Selection | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Power Supplies to Control & Auxiliary Pumps | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Sub-System Tests – IAS / Power Management / Engine Controls

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| * 1. Integrated Automation System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Power Management System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Network Throughput Tests (Including Storm & Bandwidth) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Blackout Recovery | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Generator Voltage Control System | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Diesel Engine Governor Control | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Sub-System Tests – DP, IJS & Manual Control Systems

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| * 1. Network Throughput Tests (Including Storm & Bandwidth) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. DP Controller Failures | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. DP Operator Station Failures | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. DP Network Communication Failures | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Independent Joystick – Operation & Failures | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Manual Control of Thrusters | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Sub-System Tests – Sensors & Position Reference Systems

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| * 1. Gyro Compasses | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Motion Reference Units (MRU, VRU etc.) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Wind Sensors | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. DGNSS - #1 | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Laser Based PRS’s | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Microwave / Radar Based PRS’s | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Hydro-Acoustic Based PRS’s | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Taut-Wire Based PRS’s | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Sub-System Tests – Performance Tests

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| * 1. Box Moves Including Heading Changes – Individual References (PRS’S) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Generator 100% Tests | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. Thruster 100% Tests | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Heading Control and Alarms | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. PRS Offsets | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Multi-Function Switch | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Mathematical Model Test | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed:   |  |  |  |  | | --- | --- | --- | --- | | **Wind** | XXX˚ x XX Kts | **Current** | XXX˚ x X.X Kts | | **Heading** | XXX˚ | **Seas** | XX m x XXX˚ | | **Time** | **Position** | | **Drift** | | **Start Test** | XX˚ XX.xxxx’N/S XXX˚ XX.xxxx’E/W | | N/A | | **0.5 minutes** | XX˚ XX.xxxx’N/S XXX˚ XX.xxxx’E/W | | 0.0m x 000˚ | | **1 minute** | XX˚ XX.xxxx’N/S XXX˚ XX.xxxx’E/W | | 0.0m x 000˚ | | **2 minutes** | XX˚ XX.xxxx’N/S XXX˚ XX.xxxx’E/W | | 0.0m x 000˚ | | **3 minutes** | XX˚ XX.xxxx’N/S XXX˚ XX.xxxx’E/W | | 0.0m x 000˚ | | **4 minutes** | XX˚ XX.xxxx’N/S XXX˚ XX.xxxx’E/W | | 0.0m x 000˚ | | **5 minutes** | XX˚ XX.xxxx’N/S XXX˚ XX.xxxx’E/W | | 0.0m x 000˚ | | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Sub-System Tests – Auxiliary Systems

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| * 1. Emergency Stop / Shutdowns (ESD) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Fire Fighting Systems | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Ventilation Systems | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Auxiliary Cooling (Computer Rooms etc.) | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

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| * 1. Communications | | | | | | | | | |
| Objective: Avoid “simulate” or other wording that could add confusion | | | | | | | | | |
| Configuration: This should cross-reference section 2.12 unless special configuration required | | | | | | | | | |
| Cross Reference to FMEA: | | Must Test: | | | Rolling Test: | | | Class Req’d: | |
| Tools Required: | | PMS: | | Alongside: | | In DP: | | | Time: For test |
| Method:   1. Do something 2. Do something else | | | | | | | | | |
| Results Expected:   1. Something Happens 2. Something Else Happens | | | | | | | | | |
| Results Observed: | | | | | | | | | |
| Comments: | | | | | | | | | |
| Witnessed by: | [Surveyor 1] | | [Surveyor 2] | | | | Date: | | |

Additional Verifications:

Based on guidance and the gap analysis references in the MTS TECHOP of December 2013, the following equipment can be tested at site during the DP Annual Trials, at the owner’s discretion, or verified by reference to planned maintenance records.

|  |  |
| --- | --- |
| **Action** | **Verification Method** |
| Generator 100% Test |  |
| Thruster 100% Tests |  |
| Duty / Standby Pumps |  |
| Preferential Trips |  |
| Selectivity of tie-breakers |  |
| Over Voltage |  |
| Under Voltage |  |
| Sever line current imbalance |  |
| Phase voltage imbalance |  |
| Phase voltage imbalance |  |
| Short circuit – Voltage dip / rise |  |
| Earth fault |  |
| Active power imbalance (kW) |  |
| Reactive power imbalance (kVAR) |  |
| Crash synchronization |  |
| DP Alert |  |
| Seawater cooling pressure and / or flow |  |
| Low fuel oil level |  |
| Low air pressure alarm |  |
| High cooling water temperature |  |
| Engine alarm conditions |  |
| Failure of supplies to standby redundancy |  |
| Alarms to indicate failure of thruster emergency stops |  |
|  |  |

Further test sheets will be added post-trials should the need arise.

Appendix A  
DP Trials Schedule

| **Test** | **Description** | **Proving Trials** | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Class / IMCA** | **Notes**  ***(Include timing if applicable)*** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **6.1** | High Voltage Systems (Main Bus-Tie)Partial Black Out |  |  |  |  |  |  |  |
| **6.2** | Partial Black Out |  |  |  |  |  |  |  |
| **6.3** | Low Voltage Distribution (First Step-Down 440V) |  |  |  |  |  |  |  |
| **6.4** | Low Voltage Distributions (Second Step-Down 230V) |  |  |  |  |  |  |  |
| **6.5** | Emergency Power |  |  |  |  |  |  |  |
| **6.6** | 24Vdc – Battery & UPS Systems & Distribution |  |  |  |  |  |  |  |
| **6.7** | IAS / PMS – UPS Systems & Distribution |  |  |  |  |  |  |  |
| **6.8** | DP – UPS Systems & Distribution |  |  |  |  |  |  |  |
| **7.1** | Diesel Engines / Diesel Generator Sets |  |  |  |  |  |  |  |
| **7.2** | Fuel Oil System |  |  |  |  |  |  |  |
| **7.3** | Lubrication Oil System |  |  |  |  |  |  |  |
| **7.4** | Seawater Cooling System |  |  |  |  |  |  |  |
| **7.5** | Freshwater Cooling System |  |  |  |  |  |  |  |
| **7.6** | Compressed Air System |  |  |  |  |  |  |  |
| **7.7** | Engine Room Ventilation |  |  |  |  |  |  |  |
| **8.1** | Thruster Control System |  |  |  |  |  |  |  |
| **8.2** | Thruster Hydraulic System |  |  |  |  |  |  |  |
| **8.3** | Thruster Cooling System |  |  |  |  |  |  |  |
| **8.4** | Control Mode Selection |  |  |  |  |  |  |  |
| **8.5** | Power Supplies to Control & Auxiliary Pumps |  |  |  |  |  |  |  |
| **9.1** | Integrated Automation System |  |  |  |  |  |  |  |
| **9.2** | Power Management System |  |  |  |  |  |  |  |
| **9.3** | Network Throughput Tests (Including Storm & Bandwidth) |  |  |  |  |  |  |  |
| **9.4** | Blackout Recovery |  |  |  |  |  |  |  |
| **9.5** | Generator Voltage Control System |  |  |  |  |  |  |  |
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Appendix B  
Close-Outs of Findings (If Required)

Appendix C  
Print-Outs (If Required)

The scope of this report is limited to the matters expressly covered. This report is prepared for the sole benefit of **[CLIENT / OPERATOR]**. In preparing this report, and no liability of any nature whatsoever shall be assumed to any other party in respect of its contents.

Aluciant, LLC has relied on information provided by **[CLIENT / OPERATOR]** and has made no independent investigation as to the accuracy or completeness of such information and has assumed that such information was accurate and complete. Further, Aluciant is not able to direct or control the operation or maintenance of **[VESSELS / OPERATORS]** equipment or processes.

All recommendations, findings and conclusions stated in this report are based upon facts and circumstances, as they existed at the time that this report was prepared. A change in any fact or circumstance upon which this report is based may adversely affect the recommendations, findings, and conclusions expressed in this report.

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Signature: ………………………..

[SURVEYOR]

Aluciant, LLC