



TECHNICAL AND OPERATIONAL GUIDANCE (TECHOP)

TECHOP (O-01 - Rev1 - Jan21)

DP OPERATIONS MANUAL

JANUARY 2021

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1 INTRODUCTION

1.1 PREAMBLE

1.1.1 The guidance documents on DP (Design and Operations and People) were published by the MTS DP Technical Committee in 2011, 2010 and 2012, respectively. Subsequent engagement has occurred with:

- Classification Societies (DNV, ABS)
- United States Coast Guard (USCG)
- Marine Safety Forum (MSF)
- Oil Companies International Marine Forum (OCIMF)

1.1.2 Feedback has also been received through the comments section provided in the MTS DP Technical Committee Web Site.

1.1.3 It became apparent that a mechanism needed to be developed and implemented to address the following in a pragmatic manner.

- Feedback provided by the various stakeholders.
- Additional information and guidance that the MTS DP Technical Committee wished to provide and a means to facilitate revisions to the documents and communication of the same to the various stakeholders.

1.1.4 The use of Technical and Operations Guidance Notes (TECHOP) was deemed to be a suitable vehicle to address the above. These TECHOP Notes will be in the following categories:

- General TECHOP (G)
- Design TECHOP (D)
- Operations TECHOP (O)
- People TECHOP (P)

1.2 TECHOP NAMING CONVENTION

1.2.1 The naming convention, TECHOP (CATEGORY (G / D / O / P) – Seq. No. – Rev.No. – MonthYear) TITLE will be used to identify TECHOPs as shown in the examples below:

Examples:

- TECHOP (D-01 - Rev1 - Jan21) Addressing C³EI² to Eliminate Single Point Failures
- TECHOP (G-02 - Rev1 - Jan21) Power Plant Common Cause Failures
- TECHOP (O-01 - Rev1 - Jan21) DP Operations Manual

Note: Each Category will have its own sequential number series.

1.3 MTS DP GUIDANCE REVISION METHODOLOGY

1.3.1 TECHOPs as described above will be published as relevant and appropriate. These TECHOP will be written in a manner that will facilitate them to be used as standalone documents.

1.3.2 Subsequent revisions of the MTS Guidance documents will review the published TECHOPs and incorporate as appropriate.

1.3.3 Communications with stakeholders will be established as appropriate to ensure that they are notified of intended revisions. Stakeholders will be provided with the opportunity to participate in the review process and invited to be part of the review team as appropriate.

2 SCOPE AND IMPACT OF THIS TECHOP

2.1 SCOPE

2.1.1 This TECHOP addresses the need for and importance of providing effective guidance along with clear and unambiguous instructions on managing DP Operations to Vessel Operational Teams by way of comprehensive DP Operations Manuals. This is essential to aid delivery of incident free DP operations.

2.1.2 Lessons learned from reviews of a significant number of DP operating manuals have been incorporated into this guidance. Reviews highlighted the wide variation in the content, quality of information and usefulness. Quite often there is a lack of pertinent information contained within the DP operations manuals.

2.2 IMPACT ON PUBLISHED GUIDANCE

2.2.1 This TECHOP impacts MTS DP Operations Guidance Document, Part 2, Appendices 1, 2 and 3, (Part 2, Appendix 1 Section 3.16, and Part 2, Appendix 2 & 3 Section 3.13).

3 CASE FOR ACTION

3.1 NEED FOR IMPROVEMENTS IN QUALITY AND CONTENT OF DP OPERATIONS MANUAL IDENTIFIED

- 3.1.1 There is no single standard that addresses the development of a DP Operations Manual.
- 3.1.2 The importance of providing effective and unambiguous guidance to vessel operational teams has been acknowledged, especially given the demographics of the vessel operational teams, the dilution of skills prevalent in industry and limited experience in the conduct of the industrial mission.
- 3.1.3 Certain class societies have requirements for DP Operations Manuals. However, there is a lack of consistency and standardization in these requirements.
- 3.1.4 MTS has addressed elements of the DP Operations manuals in the DP Operations guidance documents.
- 3.1.5 Some guidance is provided in the IMCA M103 & IMCA M109.
- 3.1.6 The MTS Guidance documents have highlighted the need to address the requirements for the Industrial Mission.
- 3.1.7 This TECHOP guidance supplements the existing guidance documents by appropriately addressing industrial mission requirements in the DP Operations Manual.
- 3.1.8 This TECHOP bridges the gaps identified and provides guidance on the content required in a DP Operations Manual, with a view to providing a standardized and consistent approach.
- 3.1.9 Nothing in this document precludes the vessels from having to comply with the requirements of the Classification Society or statutory bodies. The guidance provided is intended to supplement the minimum statutory requirements.

4 PHILOSOPHY

4.1 OVERVIEW

4.1.1 The key to effectively address Dynamic Positioning (DP) in managing DP operations starts with DP being identified as a Safety Critical Element (SCE). Identification as such is to be demonstrated by addressing DP operations in:

- The Safety Case (if applicable).
- Inspection repair and maintenance (IRM) programs and critical sparing philosophy.
- DP Operations Manuals (content / quality and usability).
- Level of detail in procedures.
- Drills/exercises and level of training of the stakeholders responsible for delivery of DP operations.

4.1.2 The DP Operations Manual should contain relevant information on:

- Company policies and procedures.
- Vessel specific information with emphasis on:
 - The redundancy concept of the vessel.
 - The configuration that achieves the highest level of integrity of the power plant and station keeping critical equipment (Critical Activity Mode – CAM).
 - Alternate configurations (Task Appropriate Mode) that may be used.
 - The process that is in place to identify operations that must be operated in CAM and those operations that can be operated in TAM.
 - The processes that are in place to protect and defend the redundancy concept.
 - The necessary training and drills required to be carried by the personnel tasked with delivery of DP operations.
- Industrial mission specific information.

Note: The potential for a bridging document to address Client/Project specific requirements is identified and may need to be addressed.

4.1.3 DP Operations Manuals must be checked to ensure alignment with other statutory documents. Where ambiguity or misalignment exists, resolution needs to be achieved prior to commencement of the industrial mission.

4.1.4 Crew familiarization process should include familiarization with the DP Operations Manual.

5 COMPANY PHILOSOPHY AND POLICY

5.1 OVERVIEW

5.1.1 The DP Operations Manual should have a section where the company philosophy and policy on managing DP operations is clearly stated. Key elements - Equipment, Processes and People should be addressed.

5.2 EQUIPMENT

5.2.1 Section on equipment should contain:

- Definition of the WCFDI and the DP redundancy concept of the vessel.
- Clear identification of the permissible configurations for Critical Activity Mode (CAM) and Task Appropriate Mode (TAM) with appropriate references to the FMEA. FMEA and proving trials should cover applicable configurations (CAM and TAM):
 - Power Plant.
 - Propulsors.
 - Auxiliary and supporting systems (e.g. fuel, compressed air, FW cooling, SW cooling, HVAC.)
 - Position references (including clear and unambiguous instructions on required position references for specific industrial missions and the limitations of position reference sensors).
 - Environmental sensors.
 - VMS and PMS.
 - Networks.
 - Safety systems - ESD and F&G system if applicable and relevant details of 'Cause and Effects' matrix impacting station keeping.
- Philosophy for use and management of protective functions, cross connections and automatic change overs of power plants for maintaining the redundancy concept during CAM (may need bridging with client/project specific requirements).
- Modes and features in the DP system with unambiguous instruction on use and effective controls to prevent abuse of the same.
- Interfaces of industrial mission specific equipment with DP System.
- Approach to inspection repair and maintenance.
- Sparing philosophy and management of critical spares.
- Provision of specialist support (company, vendor and 3 party specialists).
- Specific guidance on conduct of annual and periodic trials and test methodologies.

Note 1: The configuration section of the WSOG/ASOG developed per the guidance provided in the MTS DP operations guidance document can be an effective means to embed relevant particulars of the permissible configurations for CAM and TAM.

Note 2: A DP Operations Manual that does not contain a generic comprehensive ASOG/WSOG is incomplete.

Note 3: The generic comprehensive ASOG/WSOG is a good starting point to effectively manage DP operations. It is acknowledged that it will be necessary to validate and adapt the generic ASOG/WSOG as necessary for the specific industrial mission/ activity.

5.3 PROCESSES

5.3.1 Delivery of incident free DP operations is aided by effective processes. The DP Operations Manual should at the very least contain details of the following processes along with clear and unambiguous instructions on applicability and use:

- Hazards and Effects Management Process (HEMP) e.g. risk assessments, JSAs etc., with focus on station keeping.
- Process for identification of operations where TAM (if permissible) may be considered.
- Positioning Standby (Impacts on manning to be considered and addressed).
- Inspection Repair Maintenance (impacts on post failure capability and management of same).
- Effective controls (permit to work (PTW), management of permitted operations).
- Management of change on equipment related to station keeping (including systems engineering approach).
- Promulgation of technical and safety bulletins (Internal and External).
- Development, adapting and use of ASOG/WSOG.
- Process for bridging documents (client/project specific requirements).
- Notification protocols (internal and client specific).
- Process for continuous improvement including feedback loops.
- Adherence to regulatory requirements, industry guidance and agreed client specific requirements.

5.4 PEOPLE

5.4.1 The section on people should cover:

- Minimum manning levels.
Guidance: This would reflect the minimum manning levels while on DP and is not limited to DPOs.
- Training requirements of personnel engaged in DP Operations.
Guidance: Training requirements are not limited to DPOs but should include key DP staff (electrician, engineer, DPO).
- Implementation of processes meeting the development of people (MDAT).
Guidance: reference is made to the MTS document about MDAT and the creation of awareness with industrial mission-staff about DP operations and their specific responsibilities during DP operations (e.g. action to be followed on a change of DP status).
- Process to demonstrate understanding of the DP redundancy concept and defending the same by all personnel engaged in delivery of DP operations.

Note 1: Vessel's staff engaged in delivery of DP operations marine, maintenance and industrial mission personnel (when applicable) should be able to articulate:

- The redundancy concept.
- The configurations that are required to support the redundancy concept.
- Their role in maintaining/defending the redundancy concept.
- A clear and unambiguous understanding of post failure capability and impacts on post failure capability when DP related equipment is rendered unavailable.
- The content and use of ASOG/WSOG.

Ability to articulate the above will be an effective demonstration of competence in this subject.

5.5 VESSEL SPECIFIC REQUIREMENTS

5.5.1 Redundancy concept

5.5.1.1 The DP Operations Manual should outline:

- Redundancy concept of the vessel and relevant details of the principles that contribute to redundancy (Design):
 - Autonomy.
 - Independence.
 - Segregation.
 - Differentiation.
 - Fault resistance, Fault tolerance and Fault ride through.
- Vulnerabilities that may defeat the redundancy concept (Design).
- Clear and unambiguous instructions on the specific steps to be taken to protect the redundancy concept and guard against the vulnerabilities (Operations).
- Configuration for CAM and TAM.
- Thruster and Generator Operating Strategy (TAGOS) if applicable (recommended for vessels with potential for multiple configurations).

5.5.2 Position Reference Sensors (PRS)

5.5.2.1 The DP Operations Manual should contain clear instructions on the use of position reference sensors (permissible and required PRS, specific configuration if any) and the precautions to be taken to prevent degradation of operational integrity (e.g. environmental limitations, blocking of line of sight, shadowing effects of structures on antennae, locking on to spurious targets etc.)

5.5.3 Modes and features

5.5.3.1 Where specific modes and features are provided, clear and unambiguous instructions on the use and precautions must be given (e.g. Quick Current, EFC, External Tensions, Follow Target, Heavy Lift Mode etc.).

5.5.4 Sensors

5.5.4.1 The DP Operations Manual should contain clear instructions on the use of vessel sensors (permissible and required sensor configurations if any) and the precautions to be taken to prevent degradation of operational integrity (e.g. shielding of wind sensors).

5.5.5 ASOG / WSOG

5.5.5.1 Vessel specific and industrial mission specific focus.

- Maintaining segregation and independence.
- Managing rationalization of running hours of redundant equipment.
- Inputs (e.g. from simulations, installation analysis, riser analysis).
- Thruster and Generator Operating Strategy (TAGOS).
- Post failure capability.

5.5.5.2 Interfaces (EDS / ESD / external forces / tensions / F&G).

- Demonstrate a systems engineering approach.
- Cause and effects matrix.

5.5.6 Post failure capability

5.5.6.1 This section should cover the requirements to assess post failure capability when thrusters and or generators are rendered unavailable and the need to correlate to the impacts on the specific tasks being carried out in the industrial mission. This may lead to the development of implementable contingency plans.

5.6 INDUSTRIAL MISSION SPECIFIC INFORMATION

5.6.1 It is acknowledged that not all specifics for an industrial mission can be noted in the DP Operations Manual; however, it is essential that pertinent information relevant to station keeping must be addressed.

5.6.2 A comprehensive WSOG / ASOG can be leveraged to provide relevant information.

5.6.3 Interfaces between industrial mission equipment and station keeping should be addressed. This should include interfaces which have a potential effect on the DP system's performance, for example ESD and Fire and Gas systems on MODUs, tensioner systems on pipe lay vessels (EFC), draught sensors etc.

6 EXAMPLE CONTENTS OF A DP OPERATIONS MANUAL

COPY CONTROL RECORD

SIGNATURE PAGE

ABBREVIATIONS

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- 1.1 OVERVIEW OF DP OPS MANUAL AND DP SYSTEM
- 1.2 MASTER'S RESPONSIBILITY AND AUTHORITY
- 1.3 STATEMENT OF DP AS A SAFETY CRITICAL SYSTEM

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-
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 - 14.3 GREEN
 - 14.4 BLUE
 - 14.5 YELLOW
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APPENDIX I	ASOG
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7 GAP ANALYSIS

7.1 USE OF THE GAP ANALYSIS SPREADSHEET

- 7.1.1 A spread sheet has been compiled summarising the requirements and guidance on content of a DP Operations Manual.
- 7.1.2 The guidance has been compiled from the following sources:
- MTS DP Operations Guidance.
 - MTS TECHOP ODP 05 (this document).
 - IMO MSC 645.
 - IMCA M103.
 - IMCA M109.
 - Classification Society Rules.
- 7.1.3 Each item of guidance has been given an ID number and in the next column, the source of the guidance or requirement is referenced in order to enable the person conducting the gap analysis or the person revising the DP Operations Manual to find more detail and context for the requirement.
- 7.1.4 The next column allows the analyst to enter a reference to the relevant chapter, paragraph or section of the document being reviewed.
- 7.1.5 A drop down list forms part of the next column. The options are 'Yes'; 'Partial'; 'No'; or 'N/A'. The selection is made depending on whether the listed subject is adequately covered, partially covered but could be expanded or revised, not covered at all or is not applicable to the manual under analysis.
- 7.1.6 The final column for relevant comments regarding any apparent omissions or potential further review of an issue.

7.2 GAP ANALYSIS RESULTS

- 7.2.1 It has to be remembered that this is a gap analysis of the DP Operations Manual and not of the vessel or its systems.
- 7.2.2 The analysis does not attempt to give a 'pass' or 'fail' judgement on the manual.
- 7.2.3 Those items which are marked as 'No' or 'Partial' should be revisited by those responsible for the upkeep of the manual and those aspects reviewed and revised as appropriate as part of a process of continual improvement.
- 7.2.4 The analyst may not necessarily have access to further documentation regarding the vessel and it may be that items marked as 'No' or 'Partial' are in fact not applicable or the description or instruction within the manual is in fact adequate.

7.3 GAP ANALYSIS CHECKLIST

DP OPERATIONS MANUAL GAP ANALYSIS - DOCUMENT NUMBER AXXXXX REV. Y DATED dd/mm/yyyy					
THE MANUAL SHOULD ADEQUATELY INCLUDE AND/OR COVER THE FOLLOWING ISSUES AS APPROPRIATE	ID NO.	SOURCE OF REQUIREMENT	CROSS REFERENCE TO DP OPERATIONS MANUAL	SUBJECT COVERED? YES / PARTIAL / NO / NOT APPLICABLE GREEN / YELLOW / RED / GREY	COMMENT / CONCERN
Management of DP Operations:					
Company policies. DP should be identified as a safety critical element.	1	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.4 IMCA M109 Sec 3.2.7 TECHOP ODP 05 Sec 4.1.2 TECHOP ODP 05 Sec 5.1.1			
Basic principles of DP including a functional overview of a DP system.	2	MTS Ops Guidance Part 2			
Vessel specific overview of the DP system and industrial mission equipment including different control modes (e.g. heavy lift, follow sub, pipelay, thruster bias, quick current etc.)	3	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.3 IMCA M109 Sec 1.5 TECHOP ODP 05 Sec 5.2.1 TECHOP ODP 05 Sec 5.5.3 ABS Guide to DP Systems- Sec 2 Ch 13			
Vessel specific DP philosophy to include reference to CAM / TAM: ASOG: system configuration (e.g. open / closed bus): worst case failure design intent (WCFDI) and worst case failure (WCF): environmental limits: station keeping capability. Vulnerabilities of the DP system should be discussed and configurations that may defeat the redundancy concept described.	4	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.5 IMCA M109 Sec 3.2.8 TECHOP ODP 05 Sec 4.1.2 TECHOP ODP 05 Sec 5.2.1 TECHOP ODP 05 Sec 5.5.1 ABS Guide to DP Systems- Sec 2 Ch 13			
Vessel specific philosophy for converting drive off to drift off.	5	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6			
References to other relevant DP guidance and reference documents including but not limited to DP system FMEA: equipment manuals: MTS guidance: IMCA guidance: technical and safety bulletins: Class Society rules, client specific requirements.	6	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.4 IMCA M109 Sec 3.2.7 IMCA M109 Sec 3.2.11 TECHOP ODP 05 Sec 5.3.1 ABS Guide to DP Systems- Sec 2 Ch 13			

DP OPERATIONS MANUAL GAP ANALYSIS - DOCUMENT NUMBER AXXXXX REV. Y DATED dd/mm/yyyy					
THE MANUAL SHOULD ADEQUATELY INCLUDE AND/OR COVER THE FOLLOWING ISSUES AS APPROPRIATE	ID NO.	SOURCE OF REQUIREMENT	CROSS REFERENCE TO DP OPERATIONS MANUAL	SUBJECT COVERED? YES / PARTIAL / NO / NOT APPLICABLE GREEN / YELLOW / RED / GREY	COMMENT / CONCERN
Policy on access to vessel control systems (including DP control systems) by 3rd parties e.g., survey spread, remote diagnostics etc.)	7	IMCA M109 Sec 3.2.6			
Policy and procedure for conduct of DP trials including mobilization trials, annual DP trials, periodic trials and trials after modification or repair.	8	IMCA M109 Sec 3.2.10 MSC 645 Sec 4.4.4-4.4.6 IMCA M103 Sec 1.5 TECHOP ODP 05 Sec 5.2.1			
Approach to repair and maintenance including policy on carrying critical spares.	9	TECHOP ODP 05 Sec 5.2.1			
Instructions for fault finding. (May be reference to functional descriptions of systems and FMEA documents).	10	ABS Guide to DP Systems- Sec 2 Ch 13			
Management of change approach to DP related equipment.	11	TECHOP ODP 05 Sec 5.3.1			
List of abbreviations, glossary of terms and symbols	12	ABS Guide to DP Systems- Sec 2 Ch 13			
DP Systems Description and Operation: (systems should be described in adequate detail and instructions given in their use. Reference may be made to specific system operator manuals but sufficient high level instruction should be given as appropriate)					
Description of power generation, distribution, electrical systems, thrusters and propulsion (block diagram).	13	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.5 MSC 645 Sec 4.4.3 IMCA M103 Sec 1.5 ABS Guide to DP Systems- Sec 2 Ch 13			
For power systems other than the most basic, a Thruster and Generator Operating Strategy (TAGOS) may be appropriate.	14	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.5 IMCA M103 Sec 1.5 TECHOP ODP 05 Sec 5.5.1			
Description of auxiliary systems (including configuration to support the redundancy concept).	15	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.5 IMCA M103 Sec 1.5 ABS Guide to DP Systems- Sec 2 Ch 13			

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Description of power management systems.	16	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.5 IMCA M109 Sec 1.5 ABS Guide to DP Systems- Sec 2 Ch 13			
Discussion on segregation of equipment and watertight / A60 boundaries with regard to fire or flood for equipment class 3 vessels.	17	MTS Ops Guidance Part 2			
Description of vessel control systems including manual controls, the DP control system: associated operator stations and networks. Description of independent joystick (IJS).	18	MTS Ops Guidance Part 2 MSC 645 Sec 4.4.3 IMCA M103 Sec 1.5 ABS Guide to DP Systems- Sec 2 Ch 13			
Descriptions of all position reference systems, heading and environmental sensors and any other relevant sensors including but not limited to draft, current, external force etc. Description should include any limitations on sensors and precautions to prevent degradation e.g. shielding of wind sensors.	19	MTS Ops Guidance Part 2 MSC 645 Sec 4.4.3 IMCA M109 Sec 1.5 TECHOP ODP 05 Sec 5.5.4 ABS Guide to DP Systems- Sec 2 Ch 13			
Description of all routine and emergency communication systems for internal and external use.	20	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.5 ABS Guide to DP Systems- Sec 2 Ch 13			
Description of any emergency shutdown or disconnect systems. Such systems should be subject to a systems engineering approach (e.g. FMEA).	21	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
Description of any interfaces with industrial mission equipment (perhaps from other vendors) e.g. tensioner systems, external force measurement. Such systems should be subject to a systems engineering approach (e.g. FMEA).	22	MTS Ops Guidance Part 2			

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DP Operations Procedures:					
Procedures for planning DP operations including but not limited to:	23	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.2			
<i>Environmental criteria</i>	24	MTS Ops Guidance Part 2			
<i>Use of capability analysis and footprints (manual should include capability and footprint plots or clearly indicate where they may be located).</i>	25	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.8 IMCA M103 Sec 1.5 ABS Guide to DP Systems- Sec 2 Ch 13			
<i>DP system setup including power and propulsion with required levels of redundancy.</i>	26	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2 TECHOP ODP 05 Sec 5.2.1			
<i>Philosophy for the management of protective functions, cross connections and automatic changeovers for maintaining the redundancy concept during CAM operations.</i>	27	TECHOP ODP 05 Sec 5.2.1			
<i>Position reference system planning (limitations). Clear and unambiguous instructions on required position references for specific industrial missions.</i>	28	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 5.2.1 TECHOP ODP 05 Sec 5.5.2			
<i>Integration with well / activity planning.</i>	29	MTS Ops Guidance Part 2			
<i>Consideration of SIMOPS.</i>	30	MTS Ops Guidance Part 2			
<i>Risk assessment process.</i>	31	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 5.3.1			
<i>Restrictions on maintenance during DP operations and use of PTW.</i>	32	TECHOP ODP 05 Sec 5.2.1 TECHOP ODP 05 Sec 5.3.1			
<i>Procedures for developing ASOG or WSOG including but not limited to:</i>	33	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 5.3.1 TECHOP ODP 05 Sec 5.5.1 ABS Guide to DP Systems- Sec 2 Ch 13			

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<i>Identification of industrial mission activities requiring CAM or TAM</i>	34	TECHOP ODP 05 Sec 4.1.2 TECHOP ODP 05 Sec 5.3.1			
<i>Managing running hours of redundant equipment</i>	35	TECHOP ODP 05 Sec 5.5.5			
<i>Maintaining segregation and independence</i>	36	TECHOP ODP 05 Sec 5.5.5			
<i>Use of riser analysis, blackout recovery times, EDS times as appropriate</i>	37	MTS Ops Guidance Part 2			
<i>Determination of yellow and red watch circles</i>	38	MTS Ops Guidance Part 2			
<i>Development of activity or well specific criteria for the escalation of levels from normal to advisory to degraded to emergency.</i>	39	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M103 Sec 1.5			
<i>Development of activity or well specific communication protocols and methods.</i>	40	MTS Ops Guidance Part 2			
<i>Development of emergency response procedures</i>	41	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M103 Sec 1.5			
<i>Development of contingency plans to assess post failure capability and impact on the continuing conduct of the industrial mission</i>	42	TECHOP ODP 05 Sec 5.5.6 ABS Guide to DP Systems- Sec 2 Ch 13			
<i>A generic WSOG/ASOG MUST be included in the DP Operations Manual.</i>	43	TECHOP ODP 05 Sec 5.2.1			
Procedures for deployment, operation and recovery of position reference systems including correct set up of DGNSS	44	MTS Ops Guidance Part 2			
Procedures for Marine Operations including but not limited to:	45	MTS Ops Guidance Part 2			
<i>Transits*</i>	46	MTS Ops Guidance Part 2			
<i>Field arrival*</i>	47	MTS Ops Guidance Part 2 MSC 645 Sec 4.4.1 IMCA M103 Sec 1.5			

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<i>Mobilization*</i>	48	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.10			
<i>Location set up*</i>	49	MTS Ops Guidance Part 2 MSC 645 Sec 4.4.1 IMCA M103 Sec 1.5			
<i>Watch handover*</i>	50	MTS Ops Guidance Part 2 MSC 645 Sec 4.4.2			
<i>Operations planning (well, ROV, diving, cargo, helicopter etc.)*</i>	51	MTS Ops Guidance Part 2			
<i>500m zone operations*</i>	52	MTS Ops Guidance Part 2			
<i>* checklists for above as appropriate</i>	53	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.9 IMCA M103 Sec 1.5 ABS Guide to DP Systems- Sec 2 Ch 13			
<i>Selection of optimum position and heading</i>	54	MTS Ops Guidance Part 2			
<i>Limits on position and heading changes during operations</i>	55	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6			
<i>Actions during standby time</i>	56	MTS Ops Guidance Part 2			
<i>data logging</i>	57	MTS Ops Guidance Part 2			
<i>Offset and turn time checks</i>	58	MTS Ops Guidance Part 2			
<i>Adverse and heavy weather operations</i>	59	MTS Ops Guidance Part 2			
<i>High current operations</i>	60	MTS Ops Guidance Part 2			
Procedures relating to industrial mission interfaces (inputs to the DP control system: DP restrictions during operations: special precautions etc.) including for example:	61	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2 TECHOP ODP 05 Sec 5.2.1			
<i>Drilling</i>	62	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2			
<i>Diving</i>	63	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2			

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<i>Pipelay</i>	64	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2			
<i>ROV</i>	65	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2			
<i>Logistics support</i>	66	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2			
Procedures for communications including:	67	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
<i>Routine internal communications</i>	68	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M103 Sec 1.5			
<i>Routine external communications</i>	69	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M103 Sec 1.5			
<i>Emergency communication</i>	70	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M109 Sec 1.5			
<i>Alert systems</i>	71	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
<i>Testing of communication systems</i>	72	MTS Ops Guidance Part 2			
Procedures for DP Incidents:	73	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M109 Sec 3.2.12 ABS Guide to DP Systems- Sec 2 Ch 13			
<i>Definition (categorisation)</i>	74	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M109 Sec 3.2.12			
<i>Reporting</i>	75	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M109 Sec 3.2.12			

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<i>Investigation</i>	76	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M109 Sec 3.2.12			
<i>Close out and record keeping</i>	77	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6 IMCA M109 Sec 3.2.12			
Organisation and Responsibility:					
Description of the DP organisation onboard including:	78	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.2 IMCA M109 Sec 3.2.6 ABS Guide to DP Systems- Sec 2 Ch 13			
<i>Identification of key DP personnel</i>	79	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.2			
<i>Reporting lines (organogram)</i>	80	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.2 ABS Guide to DP Systems- Sec 2 Ch 13			
<i>Availability of technical and operational support both offshore and onshore.</i>	81	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 5.2.1			
<i>Manning levels for various DP operations (including positioning standby)</i>	82	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.2 IMCA M109 Sec 3.2.6 IMCA M103 Sec 1.5 TECHOP ODP 05 Sec 5.3.1 TECHOP ODP 05 Sec 5.4.1 ABS Guide to DP Systems- Sec 2 Ch 13			
Duties and responsibilities of key DP personnel	83	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.2 IMCA M109 Sec 3.2.6 IMCA M109 Sec 1.5 ABS Guide to DP Systems- Sec 2 Ch 13			

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Watchkeeping routines (including working hours) and duties including DP watchkeeping	84	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.2 IMCA M109 Sec 3.2.6			
DP watch handover procedures	85	MTS Ops Guidance Part 2			
DP log keeping and other documentation (weather, HPR beacon log etc.)	86	MTS Ops Guidance Part 2			
Standing orders for all DP control stations and any other relevant industrial mission control stations	87	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.6			
Requirements for DP training and familiarisation. (Process should lead to all personnel engaged in the delivery of DP operations being able demonstrate understanding of the DP redundancy concept and the processes necessary to defend same)	88	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2 TECHOP ODP 05 Sec 4.1.4 TECHOP ODP 05 Sec 5.4.1			
Requirements experience levels for key DP positions	89	MTS Ops Guidance Part 2			
Process for competency development (MDAT)	90	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2 TECHOP ODP 05 Sec 5.4.1			
Requirements for ongoing training both onboard and ashore (including emergency training, drills and exercises)	91	MTS Ops Guidance Part 2 TECHOP ODP 05 Sec 4.1.2			
Requirements for record keeping including but not limited to:	92	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
<i>Daily reports</i>	93	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
<i>Monthly reports</i>	94	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
<i>Tests and trials reports</i>	95	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			

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<i>Incident reporting</i>	96	MTS Ops Guidance Part 2 IMCA M109 Sec 3.2.12 IMCA M103 Sec 1.5			
<i>Equipment failure reports</i>	97	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
<i>Vendor service and repair reports</i>	98	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			
<i>General correspondence</i>	99	MTS Ops Guidance Part 2 IMCA M103 Sec 1.5			