The Nautical Institute

Certification and Accreditation Standard

Volume 1: Training and Certification

February 2025

The Nautical Institute

Certification and Accreditation Standard

Vol.1 – Training and Certification

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1 Introduction to the dynamic positioning operator training

1.1 Introduction to the Dynamic Positioning Operator Training Standard

This document provides guidance on the Dynamic Positioning Operator (DPO) Training Scheme for providers wishing to be accredited to deliver training and for prospective DPOs.

The DP Accreditation and Certification schemes were developed by The Nautical Institute (The NI), working in association with flag states, the oil industry, the diving industry and offshore contractors to establish internationally accepted standards. It has been operational for more than 30 years.

The NI's Dynamic Positioning Operator (DPO) Training Scheme is an industry-recognised professional development route to becoming a qualified DPO. The scheme is managed by The NI for the benefit of the industry and includes the DPO certification criteria and processes and sets out the accreditation procedure for training providers against agreed standards. Until 2013, it was the only training scheme for DPOs accepted internationally by the offshore industry and DPO certification by The NI is often stated as a requirement by DP vessel charterers.

In September 1983, the scheme was adopted as an internationally accepted standard for any DSV or other DP-operated vessel working within 500 meters of any offshore installation by 105 out of 110 oil industry and major oil company representatives at a working conference in Aberdeen. It was rapidly recognised by the oil Industry on a worldwide basis. Less than a month after the Aberdeen conference, the scheme was accepted as an official guideline by the then Minister of Energy for the UK North Sea operations. Shortly afterwards, it was also adopted by other North Sea operating flag states.

The NI has developed this standard in view of the IMO including DP training within Part B of the STCW Code and Convention (see end of this section). These standards have been developed and kept up-to- date with the full engagement and cooperation of all key stakeholders by working through the Dynamic Positioning Training Executive Group (DPTEG) and its regional training provider (RTP) groups.

1.2 The International Safety Management (ISM) Code and dynamic positioning (DP) training

The scheme is considered as initial training towards the DP Certificate. Further training and experience should be provided by the company as per IMCA M117 guidelines and the ISM Code.

The objectives of the ISM Code are to ensure safety of life at sea, prevent human injury or loss of life and avoid damage to the environment, in particular to the marine environment.

All companies operating and/or owning ships must:

- Provide for safe practices in ship operations and a safe working environment.
- Establish safeguards against all identified risks.
- Continuously improve safety management skills of personnel ashore and onboard ships, including preparing for emergencies related to both safety and environmental protection.
- Comply with all mandatory rules and regulations.
- Ensure that applicable codes, guidelines and standards recommended by IMO, flag states, classification societies and marine organisations are taken into account.

In regard to DP training, the ship operator, whether owner or charterer, must ensure that the DPO undertakes the required initial training, including shore courses (Induction and Simulator), and that the operator is completely familiar with the equipment installed on the ship, both for normal operations and emergency situations.

The NI does not provide DP training. Instead, it accredits training institutions to provide training to trainee DPOs. A list of accredited DP training providers can be found on The NI's website, http://www.nialexisplatform.org

The DP Operator Training Scheme requires the completion of a number of components and the participation of many parties, namely the prospective DPO, the vessel owner/operator, the Master and DPOs of DP vessels and the training centres. This document provides guidance to these parties on the requirements and operation of the scheme. The NI issues the final DP Certificate to prospective DPOs upon satisfactory completion of all training phases.

This certification scheme applies to prospective DPOs who started the new Offshore Scheme after 1 January 2015 and hold the grey logbook, as well as trainees who have opted to transfer from the old to the new Offshore Scheme.

The old Offshore Scheme refers to those who started training before 1 January 2015 and hold the A6 blue/green and A5 black logbooks. Details are on The NI Alexis Platform website.

1.3 The composition and role of DPTEG

To ensure that the scheme continues to meet current industry needs, the Dynamic Positioning Training Executive Group (DPTEG) was established to facilitate communication and input from a broad range of stakeholders.

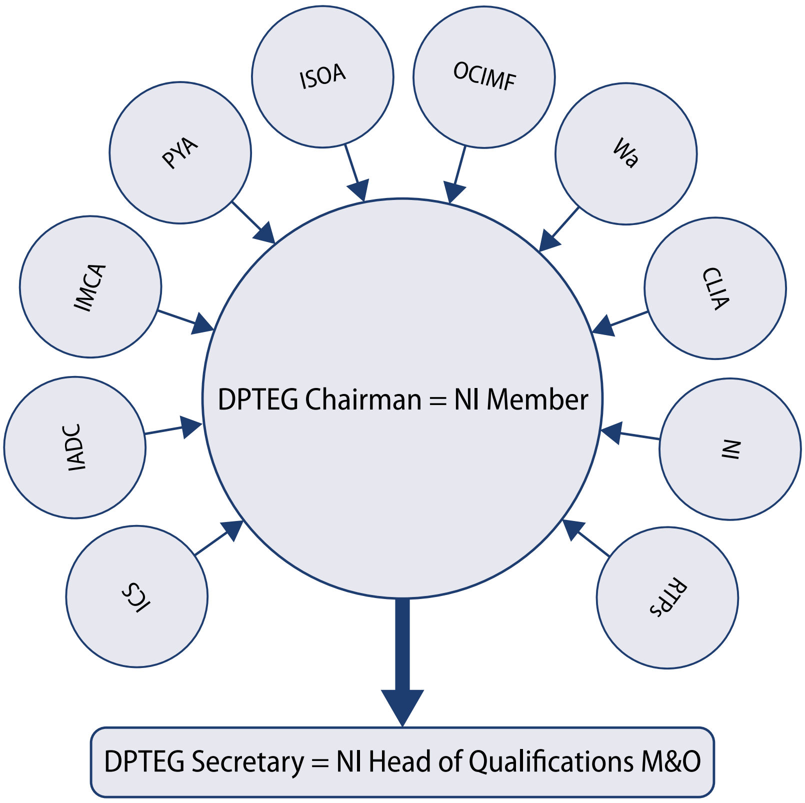
The group is a pan-industry forum of training providers, trade organisations and professional associations that have a remit or interest in DP training. It is self-funded from fees from accredited DP training providers and currently meets twice a year.

DPTEG's remit is to:

- Review and develop the DP Operator Training Scheme in respect to an ever-changing maritime industry and regulatory environment.
- Evaluate its effectiveness in providing the DP industry with trained DP operators.
- Make decisions and implement actions to improve the DP Operator Training Scheme and promote best practice.
- Make decisions on a consensus basis.
- Promote the standing of the DPO Training Scheme in the best interests of the industry.

DPTEG member organisations are:

- International Association of Drilling Contractors (IADC).
- International Chamber of Shipping (ICS).
- International Marine Contractors Association (IMCA).
- International Support Vessel Owners' Association (ISOA).
- Oil Companies International Marine Forum (OCIMF).
- Workboat Association (Wa)
- Cruise Line International Association (CLIA)
- The Professional Yachting Association(PYA)
- Accredited DP training providers represented by regional training provider (RTP) representatives in America, Europe and Asia, and The Nautical Institute.



Other organisations may be invited to join DPTEG, as appropriate. The DPTEG operates in accordance with its terms of reference. For guidance and procedures, see Annex 10 in Volume 2 of the Nautical Institute Accreditation and Certification Standard.

1.4 The role of the Nautical Institute

The NI facilitates accreditation of DP training centres, certification of DPOs and consensus-building among DPTEG members and administers the schemes in accordance with the criteria agreed by DPTEG.

1.5 The role of regional training providers (RTPs)

Training providers are located throughout the world. Since they are widely dispersed, it would be unrealistic for all training providers to gather in one location, so the centres were grouped into broad regions:

- The Americas.
- Europe and Africa.
- Asia and Australasia.

Each region elects a group representative/coordinator whose job is to inform the group of DPTEG developments and gather group concerns/responses in order to relay these to DPTEG or ask that they be included in the DPTEG meeting agenda. Communication with training providers in their region is accomplished by email or web forum contact and relayed using the same means to the DPTEG chairman or other people/groups as appropriate.

Every year each of the three RTPs holds one face-to-face meeting and one online meeting and each training centre must send a representative to a meeting at least once every three years as a condition of accreditation. If a training centre does not send a representative, the centre can relay its concerns/responses through the regional representative/coordinator. Not sending a representative at least once every three years is grounds for withdrawal ofw accreditation. RTPs operate in accordance with the terms of reference for this group. For guidance and procedures, see Annex 11 in Volume 2 of the Nautical Institute Accreditation and Certification Standard.

1.6 Minimum requirements

Following the 2010 Manila amendments to the STCW Convention and Code, The Nautical Institute has implemented the following criteria for entry into the DP Operator Training Scheme:

The minimum qualification is set at STCW Regulation II/1 - II/2 - II/3 Deck, Regulation III/1 – III /2 – III/3 – III/6 Engine and Regulation III/6 for ETOs.

STCW	Definition
II/1 Deck	Officers in charge of a navigational watch on ships of 500gt or more
II/2 Deck	Master or chief mate on ships of 500gt or more
II/3 Deck	Officers in charge of a navigational watch and Masters on ships of less than 500gt
III/1 Engine	Officers in charge of an engineering watch in a manned engine room or designated duty engineers in a periodically unmanned engine room
III/2 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000kW propulsion power or more
III/3 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of between 750kW and 3,000kW propulsion power
III/6 ETO	Electro-technical officer

Alternative appropriate marine vocational qualifications (MVQs) will be considered on a case by case basis. The NI defines an MVQ as *a non-STCW Certificate of Competency issued by a White List maritime administration for use in the administration's local waters only.*

Naval officers with appropriate watchkeeping qualifications and those whose qualification can be found on the approved list may be accepted into the training scheme without pre-approval or reference to NI. The approved list can be found on the website, here. In case of any doubt, training centres and prospective DPOs should check qualifications with The NI.

Officer trainees (cadets or ratings on a defined training programme):

- Prospective offshore DPOs on the new scheme who are in the process of training for an STCW certificate may complete the DP Induction Course (Phase A), the 60 DP sea time days (Phase B) and the DP Simulator Course (Phase C). The remaining 60 DP sea time days (Phase D) and the subsequent suitability sign-off (Phase E) must be completed only after they hold an appropriate STCW Certificate of Competency.
- Candidates who completed Phase B when they were a cadet are not allowed to claim for a sea time reduction (STR) in Phase D of the training scheme and must complete a minimum of 60 DP sea time days in Phase D.
- Prospective DPOs on the DP Self-Elevating Platform (Jack-up) Scheme who are in the process of training for an STCW certificate may complete the DP Induction Course (Phase A), the 60 days onboard with 15 DP operations (Phase B) and the DP Simulator Course (Phase C). The remaining 60 days onboard and 15 DP operations (Phase D) and the subsequent suitability sign-off (Phase E) must be completed only after they hold an appropriate STCW Certificate of Competency.
- Prospective DPOs on the Shuttle Tanker Scheme who are in the process of training for an STCW certificate may complete the DP Induction Course (Phase 1), the 24 sea time days and two offshore loading operations (Phase 2), the task section (Phase 2) and the Simulator Course (Phase 3). The remaining phases must be completed only after they hold an appropriate STCW Certificate of Competency.

These rules became effective from 1 January 2015 and reflect changes introduced from 1 January 2016; they apply to those who have already begun training on the new scheme as well as new starters. The time permitted to complete the training scheme for those who started the Induction Course after 1 January 2015 is five years.

Centres should keep electronic copies of students' documentation for a minimum of five years (or longer if required by local policies) for audit purposes and to keep track of student records and their logbook entries. . They may also be needed for reference should any questions arise at a later stage of the student's application process.

Marine Vocational Qualification (MVQ)
Before starting the Induction Course, the candidate must present their documents to the training centre. If these do not meet the minimum requirements as set out in this document, the training centre will advise the candidate to contact The NI for official approval to attend the course. The candidate must provide a copy of the documents of competency or proficiency and/or any other relevant document as evidence of qualification. The NI will assess those documents and may or may not issue an authorisation letter to the candidate to start the course. This procedure must be undertaken before the candidate starts the Induction Course. Some marine vocational qualifications do not require an authorisation letter - these are listed on the website, here.
STCW certificate of competency
Training centres are required to ask for, and keep, a copy of the Certificate of Competency of their students before accepting them on to the Induction Course and the DP scheme. The Certificate of Competency number should be noted and properly recorded by the centre in the student's record and in the logbook provided to them. The NI will require a copy of the Certificate of Competency when receiving their application to cross-check the information.
Officer trainees (cadets or ratings on a defined training programme)
Before joining the Induction Course, officer trainees should present proof, such as a letter from the company employing them or the college they are attending, indicating that they are on STCW or MVQ training.

1.7 STCW limitations on certificate

From 1 January 2012 to 31 December 2014, DP Certificates were endorsed with the following:

Valid for use in accordance with the privileges of the holder's Certificate of Competency.

From 1 January 2015, DP Certificates contained this revised sentence:

DP Certificate valid for use in accordance with the privileges of the holder's Certificate of Competency and/or Certificate of Proficiency.

From 1 January 2017 this endorsement has been used on all new and revalidated DP Certificates.

This means that the holder may use the DP Certificate only within the limitations allowed by their Certificate of Competency or Proficiency. This is to allow operators who possess non-STCW local Certificates of Competency or Proficiency to operate small DP vessels to the limits allowed on those certificates, ie within restricted areas/limits from the coast of the issuing state on vessels of a certain size only.

1.8 Old and New Training Scheme Rules

The Old Offshore Scheme and its policies will remain valid for those who started training prior to 1 January 2015. All trainee DPOs who started the training scheme before January 2015 will have their training assessed according to the old DP scheme rules, unless the trainee has opted to transfer to the New Offshore Scheme. It should be noted that only the Induction (Basic) Course will remain valid when transferring schemes (no sea time or tasks), provided all training is then completed within five years.

Trainee DPOs who started the training scheme from 1 January 2015 (ie the Induction Course) will carry on training under the criteria and conditions set up for the new training scheme.

1.9 STCW Part B1 – Guidance on the Training and Experience for Personnel Operating Dynamic Positioning Systems

Section B-V/f*

1. Dynamic positioning is defined as the system whereby a self-propelled vessel's position and heading is automatically controlled by using its own propulsion units.

2. Personnel engaged in operating a Dynamic Positioning (DP) system should receive relevant training and practical experience. Theoretical elements of this training should enable Dynamic Positioning Operators (DPOs) to understand the operation of the DP system and its components. Knowledge, understanding and experience gained should enable personnel to operate vessels safely in DP, with due regard for safety of life at sea and protection of the marine environment.

3. The content of training and experience should include coverage of the following components of a DP system:

   a. DP control station.
   b. power generation and management.
   c. propulsion units.
   d. position reference systems.
   e. heading reference systems.
   f. environmental reference systems.
   g. external force reference systems, such as hawser tension gauges.

4. Training and experience should cover the range of routine DP operations, as well as the handling of DP faults, failures, incidents and emergencies, to ensure that operations are continued or terminated safely.

   Training should not be limited to DPOs and Masters only; other personnel onboard, such as electrotechnical and engineer officers, may require additional training and experience to ensure that they are able to carry out their duties on a DP vessel. Consideration should be given to conducting appropriate DP drills as a part of onboard training and experience. DPOs should be knowledgeable of the type and purpose of documentation associated with DP operations, such as operational manuals, Failure Modes and Effects Analysis (FMEAs) and capability plots.

5. All training should be given by properly qualified and suitably experienced personnel.

6. Upon appointment to a vessel operating in DP mode, the Master, DPOs and other DP-trained personnel should be familiarised with the specific equipment fitted on and the characteristics of the vessel. Particular consideration should be given to the nature of the work of the vessel and the importance of the DP system to this work.

Note there are no corresponding regulations in the Convention or sections in part A of the Code for sections B-V/a, B-V/b, B-V/c, B-V/d, B/Ve, B-V/f and B-V/g

[1]STCW Including 2010 Manila Amendments: STCW Convention and STCW Code. International Convention on Standards of Training, Certification and Watchkeeping for Seafarers. International Maritime Organization, 2011, p34

2 Information applicable to all DP Operator Training Schemes

2.1 Statement of Suitability

The attention of Masters is drawn to this statement:

> *the suitability of the officer to undertake full DP watchkeeping responsibility onboard a DP vessel.*

This is the final assessment of the trainee DPO and Masters should carefully consider whether they are able to affirm the statements within this section before signing.

The Statement of Suitability should be completed at the end of final period of sea time prior to a certificate application being made.

Masters signing this should enter their own DP Certificate number if held. The signature and the ship's stamp should correspond to the final entry in Phase D (for Offshore Scheme) or in Phase 4 (for Shuttle Tanker Scheme). If the Master is not a DPO, the Statement of Suitability will need to be countersigned by a certified DPO onboard.

If the Master is the holder of the logbook they should have this section signed by a certificated DPO or the Relief Master onboard, who should enter their own DP Certificate number.

2.2. Time to complete the training scheme

To avoid deterioration of skills during the training period, all elements of the DP Operator Training Scheme must be completed within five years. The five-year rule applies for those who have entered the schemes from 1 January 2015.

When applying for a new certificate and submitting documents to The Nautical Institute, all components of the programme (shore-based courses, DP sea time, task sections, Statement of Suitability form and other elements) must have been completed within the five years prior to the date the Statement of Suitability is signed. In the event any of the training phases fall outside the five-year validity period, the trainee will be required to repeat the expired training phase. Providing all training has been completed within this timeframe, the time between the date the Statement of Suitability was signed and the date the application is received at The NI should not exceed three months.

2.3 Company confirmation letter

Trainee DPOs are required to provide a confirmation or testimonial letter from their shipping companies for all the DP sea time in Phases B and D of the Offshore and DP Self-Elevating Platform (Jack-up) Scheme, or for all the sea time and offshore loading of the Shuttle Tanker Scheme. This is also valid for those revalidating using any DP sea time dated after 1 January 2014. This letter must follow the conditions below:

- Be written on original headed paper from the shipping company.
- Be signed and stamped by the operations manager or marine superintendent or equivalent. Letters signed by Masters or agency staff are not acceptable.
- Be written and dated only after the DPO has completed the DP sea time claimed.
- Confirm the total time the applicant has performed as a trainee DPO onboard the vessel(s).
- Offshore Scheme: recorded DP sea time must only include actual DP time served onboard the vessel(s), not time on leave, attending courses etc. This DP sea time must be broken down and listed as individual trips and days.
- Offshore Scheme POSMOOR/TAM DP vessels: DP sea time can be claimed onboard a POSMOOR/TAM DP vessel only when the vessel does not have a mooring system deployed. The company DP sea time confirmation letter must confirm that the time was completed when the vessel did not have a mooring system deployed. If applicable, The NI reserves the right to ask for future and more detailed information, such as a deck log.
- DP Self-Elevating Platform (Jack-up) Scheme: recorded days onboard, number, dates and locations of the DP operations
- Shuttle Tanker Scheme: recorded sea time, number, dates and location of the offshore loading operations.
- Limited DPO Certificate-holders upgrading to Unlimited Certificates need only provide confirmation of DP sea time days gained after their Limited Certificates were issued.
- DP sea time (for Offshore Scheme), offshore loading operations (for Shuttle Tanker Scheme) and DP operation (for Self-elevating Scheme): experience not covered by a letter will not be considered for the DP application unless the candidate can prove extenuating reasons.
- The confirmation letter must be obtained by the candidate and sent to The NI with their application, not afterwards. Applications received by The NI without a confirmation letter for all the DP sea time claimed will be treated as a query, which will delay issuing a certificate.
- It is the company's responsibility to cross-check the DP sea time claimed by the trainee DPO to ensure that the candidate has completed the proper training and undertaken the correct amount of DP sea time. Should any false statement be received, The NI reserves the right to take such action as necessary. The company should check the information that they are confirming against deck/DP logs and internal information.
- The NI reserves the right to undertake spot checks directly with the company to confirm the signees and any other relevant information for verification of sea time. This includes the daily report of the vessel and the crew list.

2.4 Certification application

The attention of trainee and Masters is drawn to the Logbook and Application guides that are available on The NI's Alexis Platform website here and on request from The NI.

It is strongly recommended that the relevant guides are read before making an application to avoid incorrect completion of the logbook. Failure to meet the application requirements for a certificate will cause a delay in issuing the certificate.

The logbook has been designed so that all elements of the training scheme can be completed and entered. To apply for a DP Certificate, the applicant is required to register their personal details and DP sea time online through The NI's Alexis Platform website.

It is important that every period of service onboard a DP vessel should have a start and finish date and be authenticated by the Master's signature. Entries without a finish date will not count towards the required DP sea time.

If the trainee DPO wishes to submit their logbook while still onboard the DP vessel, they should have an appropriate date entered; that date may not be in future. Entries should not be block-signed or stamped.

The trainee DPO may decide to stay onboard after submitting their logbook to be assessed and verified by The NI. In that case this sea time cannot be used or counted towards DP sea time to obtain the DP Certificate and/or a future upgrade of their DP Certificate. The NI will only consider sea time gained after the DP Certificate has been issued.

After completing the online application, the applicant must upload the following documents to their account before sending to The NI:

- Copy of the STCW or NVQ certificate (page with personal details, validity date and CoC number).
- Original DP logbook.
- Copy of passport personal details page.
- Original company confirmation letter/s confirming all DP sea time.
- Any other supporting documentation.

The NI reserves the right to return the logbook and application to candidates who do not apply online or if anything is found to be incorrect or incomplete in the application or training.

Candidates whose companies have verified that their applications have met the requirements before they submit those applications to The NI tend to be more successful. Verification also assists the company in managing their DP personnel and their training and progression.

2.5 Loss of certificate or logbook

The NI treats certificates and logbooks as controlled, official documents that cannot exist in more than one copy. If the new logbook (grey or burgundy) is lost, the trainee is required to provide an affidavit and police report to The NI. Only The NI can replace the logbook. The logbook will be allocated the same individual number as the lost one and will bear a stamp on the appropriate pages indicating that it is a duplicate.

If the trainee DPO holds an old version of the DP logbook, two situations will be considered.

Holders of blue or green logbooks:

- These logbooks are not numbered and can be replaced by either the training centre where the trainee DPO undertook the Induction Course, or The NI. A replacement will be issued on condition of receiving a copy of the affidavit and police report from the trainee DPO. Please note some training centres may no longer hold stock of these logbooks. If this is the case, please contact The NI.

  Training centres are required to inform The NI of every logbook replaced and a note is put into the trainee DPO's NI account for future verification. If a DP Certificate has been issued, then the duplicate logbook and certificate can only be replaced by The NI.

Holders of black logbooks issued since 2013:

- These logbooks are numbered and only The NI can replace them. The original affidavit and police report must be sent to The NI.

The logbook will be allocated the same individual number as the lost one and each page will bear a stamp indicating it is a duplicate.

2.6 False information or fraudulent applications

The NI continues to receive a number of fraudulent DP applications. Staff and training centres are being especially vigilant and cross-check directly with companies to verify DP sea time claimed by trainee DPOs. Applications and certificates that are found to be fraudulent may be revoked and the individual banned from The NI's DP Operator Training Scheme for a period of up to five years. Others found involved in the fraud cases may also have their DP Certificates removed and be banned from the system for a period of one to five years, dependent on the evidence presented. The NI reserves the right not to accept applications or letters from companies involved in fraudulent cases.

3 Offshore Training Scheme

3.1 The DP Offshore Training Scheme

By completing the DP Offshore Training Scheme within five years the DP operator may receive one of the three types of DP certificate:

Unlimited Certificate: for training completed onboard vessels classed DP1/2/3 where at least 60 DP sea time days have been completed on vessels of DP Class 2 or 3, and at least 30 of these days have been completed as the last sea time in Phase D.

Limited Certificate: for training completed onboard vessels classed DP1/2/3 where less than 60 DP sea time days have been completed on vessels of DP Class 2 or 3.

Restricted to Unclassed vessels: for training completed onboard vessels of Unclassed DP, DP Class 0 or a mix of experience onboard classed and unclassed vessels where insufficient time has been completed to be eligible for one of the other certificates.

3.2 Dynamic Positioning Offshore Scheme courses

Induction course (see Annex A)

This course involves both theory and practice on a simulated DP system and covers the following topics:

- Principles of DP.
- Elements of the DP system.
- Practical operation of the DP system.
- Position reference systems.
- Environment sensors and ancillary equipment.
- Power generation and supply and propulsion.
- DP operations.

Simulator course (see Annex B)

This course principally involves simulated DP operations including errors, faults and failures. It gives participants the opportunity to apply the lessons learnt in both the Induction Course and subsequent DP sea time days. It covers the following topics:

- Practical operation of the DP system.
- DP operations.
- DP alarms, warnings and emergency procedures.

Sea time reduction course (STR) (see Annex C)

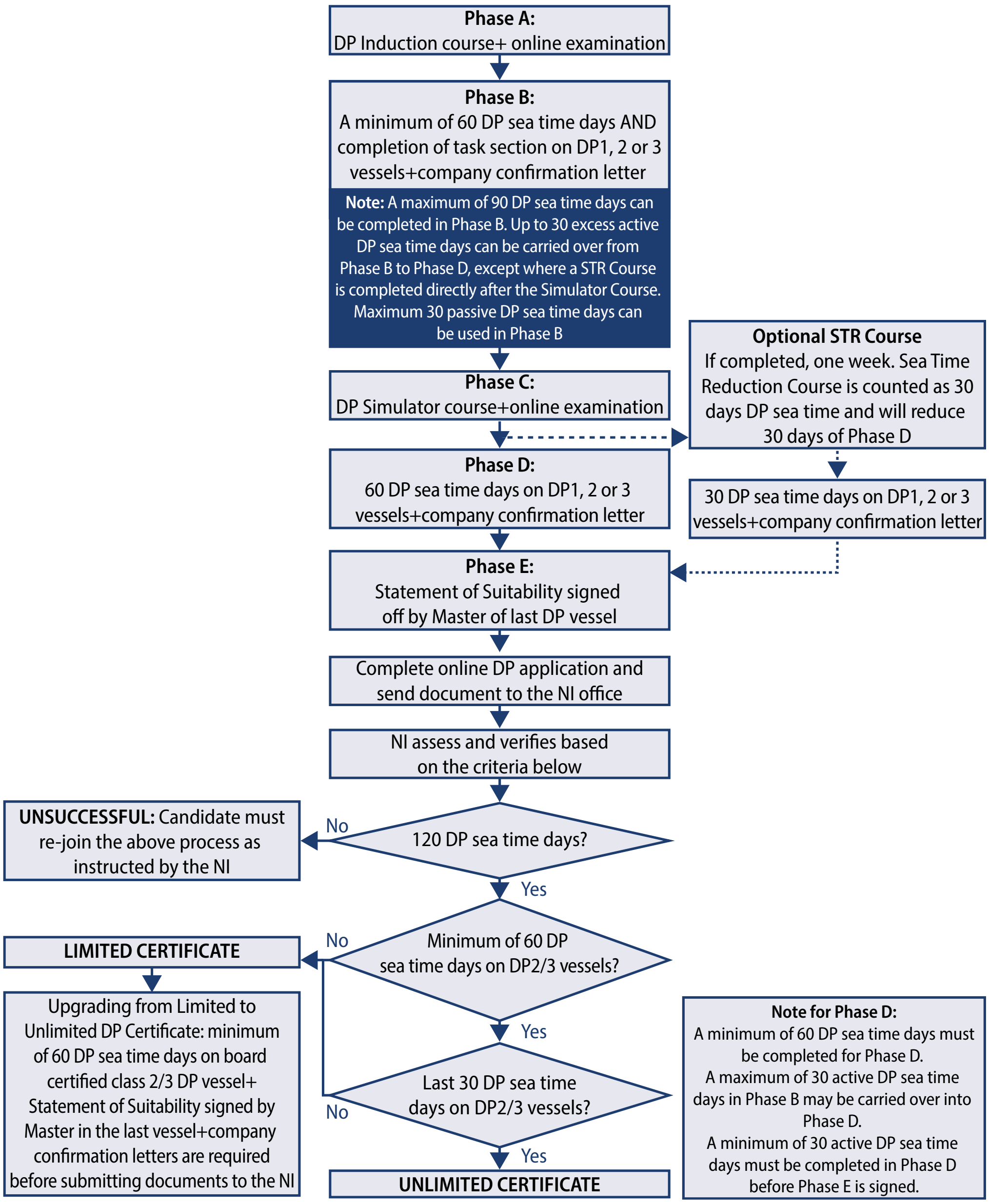
The period of supervised DP watchkeeping during the second block of DP sea time may be reduced on the satisfactory completion of an intensive DP simulator training course.

Revalidation course (see Annex F)

This course allows a certified DPO to revalidate without the sea time requirement when taken for the first time, or when taken after a subsequent revalidation with 150 DP sea time days.

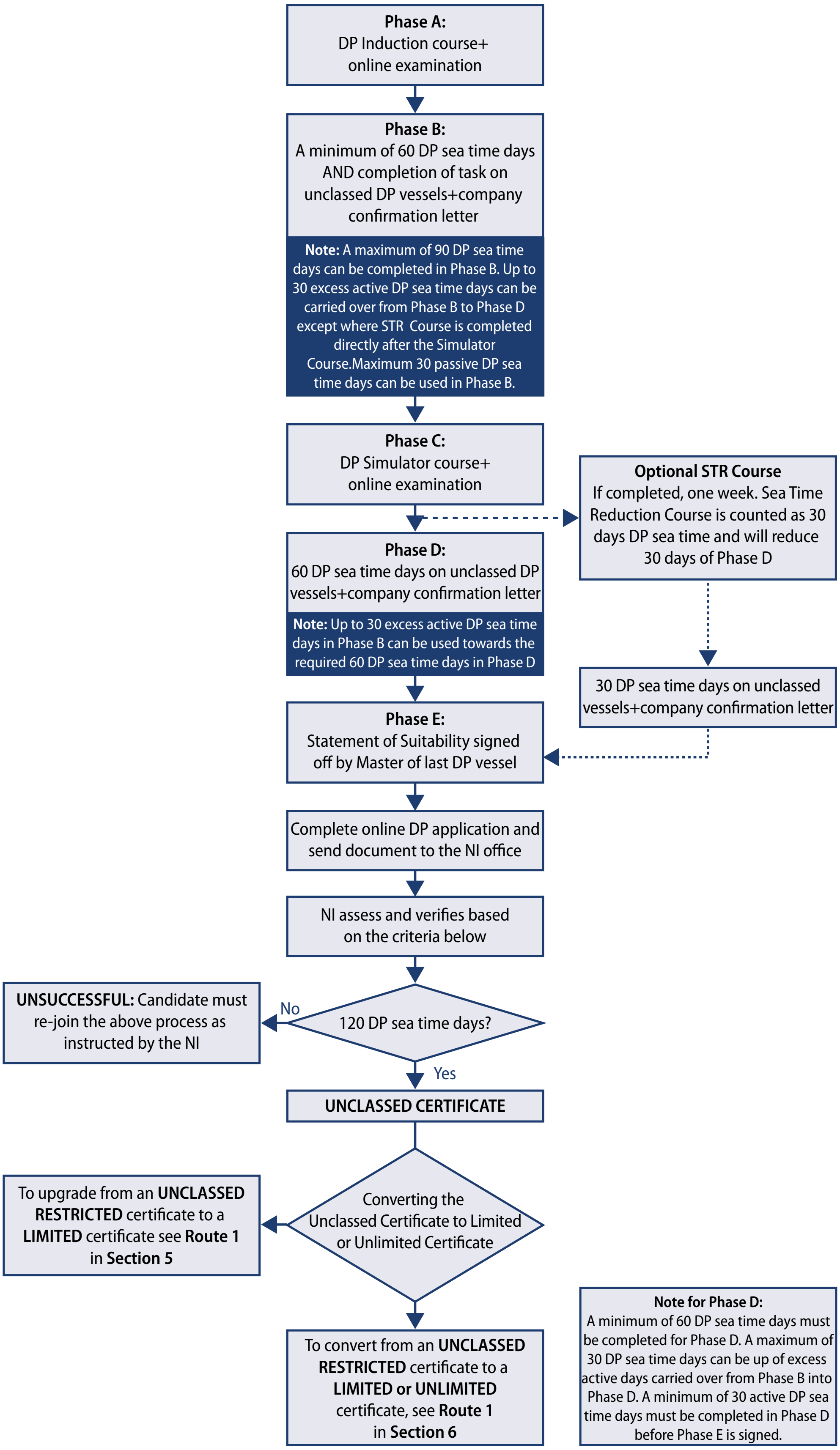
3.3 Offshore Limited/Unlimited DP Certificate flowchart

The components of the scheme are set out in the following flowchart. To obtain a DP Operator Certificate (Limited and Unlimited), the route outlined below must be followed. The old scheme route to obtain a DP Operator Certificate can be found in the DP Information Centre on The NI website.



3.4 Offshore Unclassed DP Certificate flowchart

This flowchart sets out the route that must be followed to obtain a DP Operator Certificate (restricted to Unclassed vessels).



3.5 Phases B and D – DP sea time and tasks

Definition of DP sea time day

One DP sea time day can be counted if the trainee DPO is involved with active or passive DP training for a minimum of two hours per day claimed. The allowance of up to 25% of **total** qualifying time in passive mode may only be completed during Phase B (**up to a maximum of 30 days**). A minimum of 75% of the total DP sea time claimed must be done in active mode.

Note: The wording concerning the amount of passive sea time allowed has been changed to clarify the rules for both the trainee DPOs and for the training centres.

<u>Active – with propulsion</u> under the guidance of a NI-certified DPO:

- Using the DP system to control the ship.
- Setting up on DP.
- Completing task sections combined with DP operations.
- Time on watch as part of a member of the DP watch or monitoring DP watch (Master).
- FMEA trials.
- Annual trials.
- Class trials.
- Charterer trials.
- Field arrival trials.
- DP proving trials.
- Emergency shiphandling training using manual controls using only the thrusters available after worst case failure.

<u>Passive – without propulsion</u> under the guidance of a NI-certified DPO:

- Training on inbuilt ship-based DP simulator on a vessel with simulator mode in the DP system or a standalone DP simulator.
- Task sections training and assessments by a NI-certified DPO and countersigned by the Master.

Notes about the DP sea time definition

- Not all DP training has to be completed monitoring the DP system with the vessel in a high-risk position.
- Passive DP sea time allows DPOs to gain DP training and familiarisation with a vessel without exposing the vessel to risk.
- Passive DP sea time can only be claimed between the induction and simulator courses.
- Most of the tasks in the task section of the logbook can be completed using passive DP sea time. The task section of The NI DP logbook clearly states what training can be conducted in passive mode.
- The NI DP sea time days allow for many different DP vessel types and operations and specify the minimum number of hours that will count as a day. If the ship and trainee DPO is engaged in DP for more than two hours in the day, only one day may be claimed.
- DP sea time cannot be counted in any circumstances when using the DP autopilot mode.
- It is the duty of the senior DPO (NI-certified DPO onboard) to verify and sign off DP tasks.
- DP sea time must be verified and signed off by the Master.
- The definition of DP sea time and the active and passive concept is not valid for the Shuttle Tanker Training Scheme. (See Section 5 for information about Shuttle Tanker days.)
- Position mooring or thruster-assisted mooring (TAM): The time onboard a vessel with the classification of POSITION MOORING or THRUSTER-ASSISTED MOORING (TAM) and DP class notation can be counted as DP sea time for initial DP training. The NI requires the candidate to present evidence that the anchor was not deployed for the DP sea time claimed during DP operations when applying for a DP certificate.

There is one page for each embarkation for recording DP sea time in the logbook. These pages will hold the information for 10 DP days so additional pages may need to be used to record all DP days for the embarkation. The DP sea time dates must be recorded individually each day according to the DP operation of the vessel. This is to be signed off by the certificated DPO/Master.

Practical training with manual shiphandling is not counted except as stated above. Every trainee DPO must be able to control a vessel manually, but manual shiphandling training must be conducted in addition to DP training.

The allowance of up to 25% of the qualifying time in passive mode may only be completed during Phase B. More details on the definition of a DP sea time day can be found in the 'Clarification Note from The Nautical Institute – Guidance to Masters and DPOs', which is available on The NI website.

Note: Certificated Senior DPO is the DP operator holding a valid NI DP Certificate with delegated responsibility from the Master as the senior person in charge of the DP watch.

3.6 DP sea time between the Induction and Simulator courses, task section

A minimum of 60 DP sea time days between these courses is required for completion of the task sections of the logbook. Candidates are eligible for admission on to the DP Simulator Course only if the DP Induction Course and task section is in date. Training centres are not permitted to accept students on to the Simulator Course if the task sections are not fully completed.

Any time gained in excess of the 60 DP sea time days in Phase B, between the induction and the simulator courses (to a maximum of 30 days), will normally be counted towards the total requirement of 120 DP sea time days. However, the candidate must complete at least 30 DP sea time days after the DP Simulator Course and obtain the Statement of Suitability signed by the Master of the last vessel the candidate has served on before submitting their documents to The NI.

Note: Trainee DPOs completing the blended DP Induction Course return to the training centre within three months after completion of the online theory lessons to complete the induction course in its entirety. No sea time will be accepted until the induction course is completed in its entirety.

The DP sea time should be carefully and accurately entered in this section. It is important that the DP class and the DP system are entered. The dates of joining and leaving the vessel may be confirmed through the discharge book, but not the DP sea time, which must be confirmed by the company to verify the DP sea time logged.

Any DP sea time gained while the logbook is at The NI for verification will now be counted towards gaining certification or applying for an upgrade

The task section can only be signed off by a certificated DPO onboard the vessel. Those responsible for signing this section of the logbook should adhere to high professional standards and appropriately rigorous assessments of trainees before signing that a training task has been completed.

The tasks must not be block-signed; each task must be signed and dated individually.

The Master is required to countersign each section once all tasks in that section have been completed and signed by a certified DPO onboard. If the Master is a certified DPO onboard, then a note shall be made in the logbook and the Master's DP Certificate number must be annotated for verification. The Master can then sign both sections.

If the trainee DPO is the Master, they are permitted to sign off the task sections once the certified DPO onboard has signed off the tasks for that section individually.

3.7 DP sea time reduction

The period of supervised DP sea time days after the DP Simulator Course may be reduced by a maximum of 30 days by the satisfactory completion of a STR Course.

This course can be done straight after the Simulator Course, but trainee DPOs are required to do a minimum of 30 DP sea time days onboard a classed DP vessel after the course and have the Statement of Suitability signed by the Master after completing the seatime. A company confirmation letter is required for verification of that DP sea time.

As with the other components of the scheme, all DP time or courses leading to reduction of DP time must have been completed within the previous five years.

The Sea Time Reduction training cannot be used for upgrading a certificate from Limited to Unlimited.

3.8 Calculation of sea time to issue an Unlimited Certificate, Limited Certificate or Unclassed Restricted Certificate

UNLIMITED CERTIFICATE will be gained if the trainee DPO has:

- 120 DP sea time days entirely done onboard a DP2/3 classed vessel, or
- 120 DP sea time days, of which a minimum of 60 DP sea time days are onboard a DP2/3 vessel, which must include the final 30 DP sea time days before the Phase E sign-off.

LIMITED CERTIFICATE will be gained if the trainee DPO has:

- 120 DP sea time days onboard a DP1/DP2/DP3 classed vessel where less than 60 required DP sea time days are completed onboard a DP2/3 vessel.

UNCLASSED DP VESSEL RESTRICTED CERTIFICATE will be gained if the trainee has:

- 120 DP sea time days onboard a DP Unclassed vessel, or
- 120 DP sea time days onboard a DP Class 0, or
- 120 DP sea time days with a mix of experience onboard classed and Unclassed DP vessels where the conditions identified above have not been met.

Note:
DP-certified classed vessel means the vessel must have a DP Class 1, 2 or 3 notations with a certificate issued by a classification society and not simply be fitted with DP equipment or capability.
Unclassed vessel means one with a DP capability but not classified or certified by a classification society. The NI also considers DP Class 0 vessels fall under this definition.

3.9 Upgrading from Limited to Unlimited Certificate

To upgrade from a Limited to an Unlimited Certificate, the DPO will need to obtain a minimum of 60 DP sea time days onboard DP2 or 3 classed vessels, recorded in an NI DP logbook. Any DP sea time logged onboard DP2 or DP3 classed vessels previously used to obtain the original Limited Certificate cannot be counted again, but any other valid sea time on a DP2 or DP3 classed vessels that has been gained after the date the original Limited Certificate, or after a revalidated Limited Certificate has been issued, and whilst the certificate is still valid, will count for the issuance of an Unlimited Certificate. Only sea time that has been logged within the previous five years at the time of application will be valid for this purpose. However, provided the application is made within three months of the date of the signing of the Statement of Suitability, the five years can be counted up to the date of signing. The NI will implement this on a case-by-case basis.

When applying to upgrade to an Unlimited Certificate, The NI will require the logbook, a new Statement of Suitability upgrade form signed by the Master of the last Class 2 or 3 vessel, the original Limited Certificate and the confirmation letter from the shipping company for the new sea time experience to be sent with the application.

The online application for an upgrade should be carried out before sending in the documents listed above to The NI. The applicant must use the same candidate customer account number that was issued prior to their first DP Certificate. Once all qualification requirements have been confirmed, The NI will issue an Unlimited Certificate.

3.10 Converting from Unclassed to Limited/Unlimited

Information on how to convert an Unclassed DP Certificate to a Limited or Unlimited DP Certificate can be found in Section 6.

4 DP Self-Elevating Platform (Jack-up) Training Scheme

4.1 The DP Self-Elevating Platform (Jack-up) Training Scheme

By completing the DP Self-Elevating Platform (Jack-up) Training Scheme the DP operator will receive a 'Restricted to Self-Elevating Platform' DP Certificate. This type of certification is restricted to DPOs who have completed their DP training onboard self-elevating vessels.

DP Self-Elevating Platform (Jack-up) training is completed differently from the Offshore Training Scheme and trainees should look carefully at the differences. The training scheme uses the same DP Offshore Logbook for recording the time onboard the vessel, but additional documents must be completed.

It uses the same lettered phases as the offshore scheme, trainee's record days onboard the DP vessel and number of DP operations. A minimum of 60 days onboard a DP classed vessel plus 15 DP operations must be completed in Phase B along with the task sections and then 60 days onboard a DP classed vessel and 15 DP operations are also required for Phase D. The days onboard in Phases B and D are to be recorded within these sections of the logbook. The DP operations that are completed during this time onboard will be recorded on an additional form. The DP sea time should be carefully and accurately entered in these sections. It is important that the DP class and the DP system are entered.

The task section for the DP Self-Elevating Platform (Jack-up) Training Scheme also differs from the Offshore Training Scheme. A separate task section document has been produced that will replace the task sections within the logbook.

The task section may only be signed off by a certificated DPO onboard the vessel. Those responsible for signing this section of the logbook should adhere to high professional standards and appropriately rigorous assessments of trainees before signing that a training task has been completed.

The tasks must not be block-signed; each task must be signed and dated individually.

The Master is required to countersign each section once all tasks in that section have been completed and signed by a certificated DPO onboard. If the Master is a certified DPO onboard, then a note shall be made in the logbook and the Master's DP Certificate number must be annotated for verification. The Master can then sign both sections. The signature confirming the time onboard the DP vessel in the logbook should match the Master's signature for the tasks for the dates that they were onboard.

If the trainee DPO is the Master, they are permitted to sign off the task sections once the certified DPO onboard has signed off the tasks for that section individually.

Copies of the additional documents required for the DP Self-Elevating Platform (Jack-up) Scheme can be obtained from the training centre and from The NI Alexis Platform website.

Company confirmation letters are required for all DP operations and sea time.

Any DP sea time gained while the logbook is at The NI for verification will now be counted towards gaining certification or applying for an upgrade.

4.2 Dynamic Positioning Offshore Scheme courses

Induction Course (see Annex A)

This course involves both theory and practice on a simulated DP system and covers the following topics:

- Principles of DP.
- Elements of the DP system.
- Practical operation of the DP system.
- Position reference systems.
- Environment sensors and ancillary equipment.
- Power generation and supply and propulsion.
- DP operations.

Simulator Course (see Annex B)

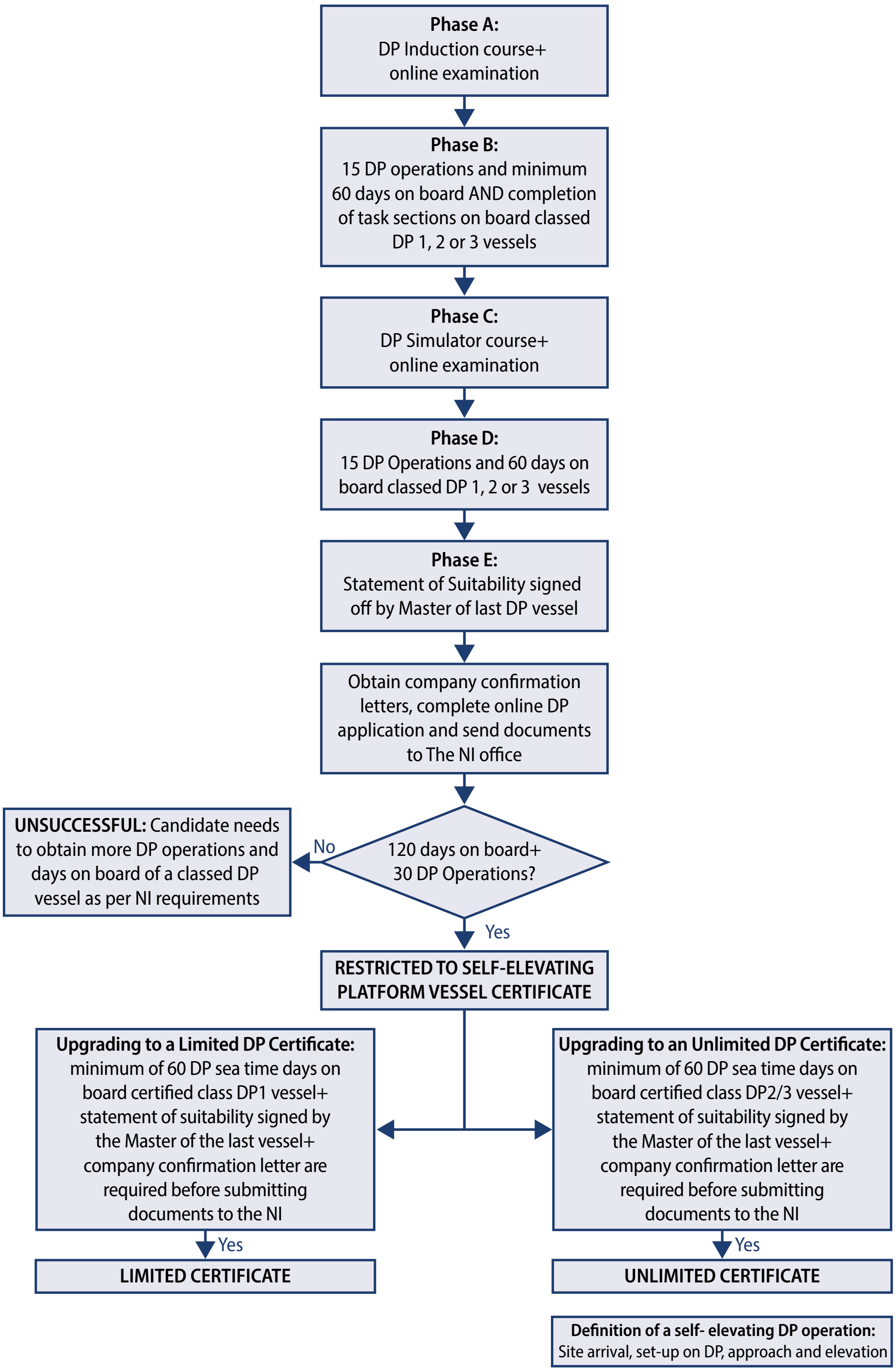
This course principally involves simulated DP operations including errors, faults and failures, giving the participants the opportunity to apply the lessons learnt in both the Induction Course and subsequent DP sea time days. It covers the following topics:

- Practical operation of the DP system.
- DP operations.
- DP alarms, warnings and emergency procedures.

4.3 Converting from Restricted to Self-Elevating Platform DP Certificate to a Limited/Unlimited DP Certificate

Information on how to convert from a Restricted to Self-Elevating Platform DP Certificate to a Limited or Unlimited DP Certificate can be found in Section 6.

4.4 Self-Elevating Platform (Jack-up) DP Certificate flowchart



5 Shuttle Tanker Training Scheme

5.1 DP Shuttle Tanker Training Scheme

On successful completion of the Shuttle Tanker Training Scheme the DP operator will receive a Restricted Shuttle Tanker Certificate. This type of certification is restricted to DPOs who have completed their DP training onboard DP shuttle tanker vessels.

Shuttle tanker training and the definition of sea time is completely different to the Offshore Training Scheme and trainees should look carefully at the differences. Shuttle tanker training has a total of four phases to be completed by the trainee DPO as described below:

Phase 1: DP Induction Course + online examination.

Phase 2: The activities in Phase 2 can be done in any order*.

Pathway A: Minimum 96 days as practical time onboard a shuttle tanker with participation in at least eight offshore loading operations (field arrival, set-up approach, connection, loading, disconnection and departure). Both criteria must be achieved, ie if the trainee completes only seven offshore loading operation within 96 days, it will be necessary for the trainee to undertake more sea time until they complete the eighth offshore loading operation as required.

OR

Pathway B: Minimum of 96 days onboard with participation of six onboard simulation loading operations and four real loading operations (field arrival, set-up approach, connection, loading, disconnection and departure). The onboard simulators may be used to simulate a real experience of approach to buoys and positioning during loading operations. The engine and bridge team work together to simulate problems with thrusters and power management.

Activities (Same required for both pathways)

- **Activity 1:** DP Simulator Course to help consolidate general DP theory and understanding as well as coping with errors, faults and failures + practical assessment + online examination. (A minimum of 24 days sea time and two offshore loading operations must be completed before the trainee attends the DP Simulator Course).
- **Activity 2:** Training Course A - Position reference system course.
- **Activity 3:** Training Course B – Shuttle tanker-specific simulator course.

Phase 3: Minimum of 24 sea time days as practical time onboard a shuttle tanker with participation in at least two complete offshore loading operations to include field arrival, set-up approach, connection, loading, disconnection and departure.

Phase 4: Statement of Suitability signed off by the Master of the last shuttle tanker vessel. Applicants must also provide confirmation letters for all sea time and offshore loading operations.

*A minimum of 24 days sea time and two offshore loading operations must be completed before the trainee attends the DP Simulator Course.

The shuttle tanker vessel Master and the vessel operating company are both required to confirm that the trainee's practical experience and understanding is satisfactory. This provides the assurance that the trainee's recorded entries are legitimate and that they have achieved a recognised level of competence.

The Shuttle Tanker Scheme gives an aggregate minimum of 120 days onboard and a minimum of 10 loading operations as the pre-certification practical experience. The Phase 3 practical experience stage must comply with 24 days onboard and two complete loading operations – whichever limit is reached last. There is no option for any sea time reduction within this programme, ie the Sea Time Reduction and Offshore Loading Courses will not reduce the sea time required but will be counted for training purposes only.

Note: Offshore loading operations not conducted with the DP system in use shall not be counted as Offshore Loading Operations within the training and certification scheme.

Definition of shuttle tanker days: Shuttle tanker sea service days are not the same as those in the offshore scheme. Shuttle tanker sea time days are considered the days from embarking to disembarking the shuttle tanker. However, the times recorded for the offshore loading operations should be done while the vessel is operating in DP mode.

Submission of an application to The NI for the Shuttle Tanker DPO Certificate shall be made upon satisfactory assessment of performance. Appropriate confirmations and details from the Master and company that the training regime has been complied with are required with the application. Training entries are to specify the location and type of installations experienced.

5.2 Shuttle Tanker Training Scheme courses

The Shuttle Tanker Training Scheme requires the trainee to complete the same DP Induction and DP Simulator Courses required of all other DP trainees. In addition, Shuttle Tanker Course trainees must complete two additional courses, as below.

Induction course (see Annex A)

This course involves both theory and practice on a simulated DP system and covers the following topics:

- Principles of DP.
- Elements of the DP system.
- Practical operation of the DP system.
- Position reference systems.
- Environment sensors and ancillary equipment.
- Power generation and supply and propulsion.
- DP operations.

Simulator course (see Annex B)

This course principally involves simulated DP operations including errors, faults and failures, giving the participants the opportunity to apply the lessons learnt in both the Induction Course and subsequent DP sea time days. It covers the following topics:

- Practical operation of the DP system.
- DP operations.
- DP alarms, warnings and emergency procedures.

Course A (see Annex D)

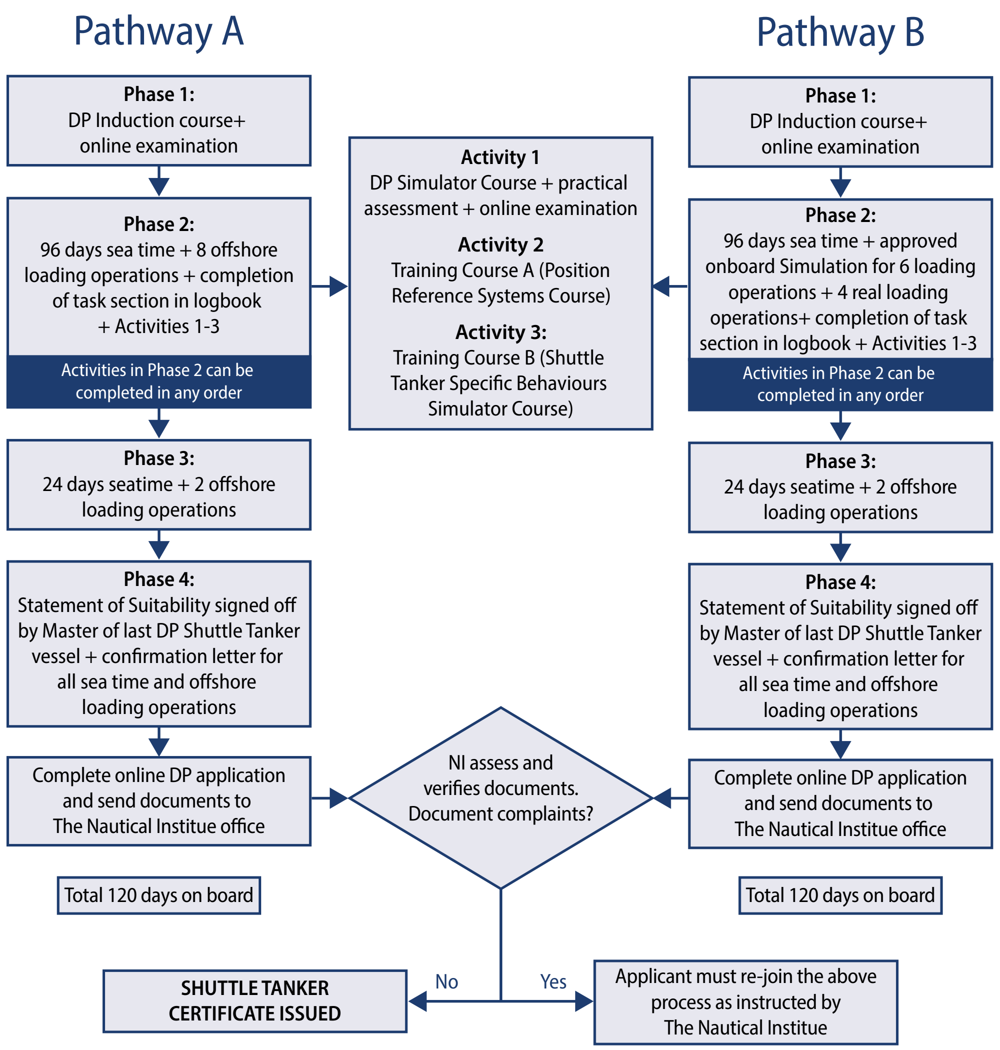
One- or two-day training courses that are provided by either the training centres or the manufacturers of position reference systems (PRS). These courses are recognised, not accredited, by The NI. More information regarding recognition of a course can be found on the website, The Nautical Institute Academy Courses (nautinst.org).

Course B (see Annex E)

This is a five-day simulator training course with a minimum of 30 hours of instruction that concentrates on shuttle tanker-specific behaviours and includes exercises for a range of offshore loading installation types. This course is accredited by The NI.

5.3 Shuttle Tanker DP Certificate flowchart

The components of the scheme are set out in the following flowchart, which illustrates the route that must be followed in order to obtain a Shuttle Tanker Certificate (restricted to shuttle tankers).



6 Revalidation criteria and conversion routes for DP certificates

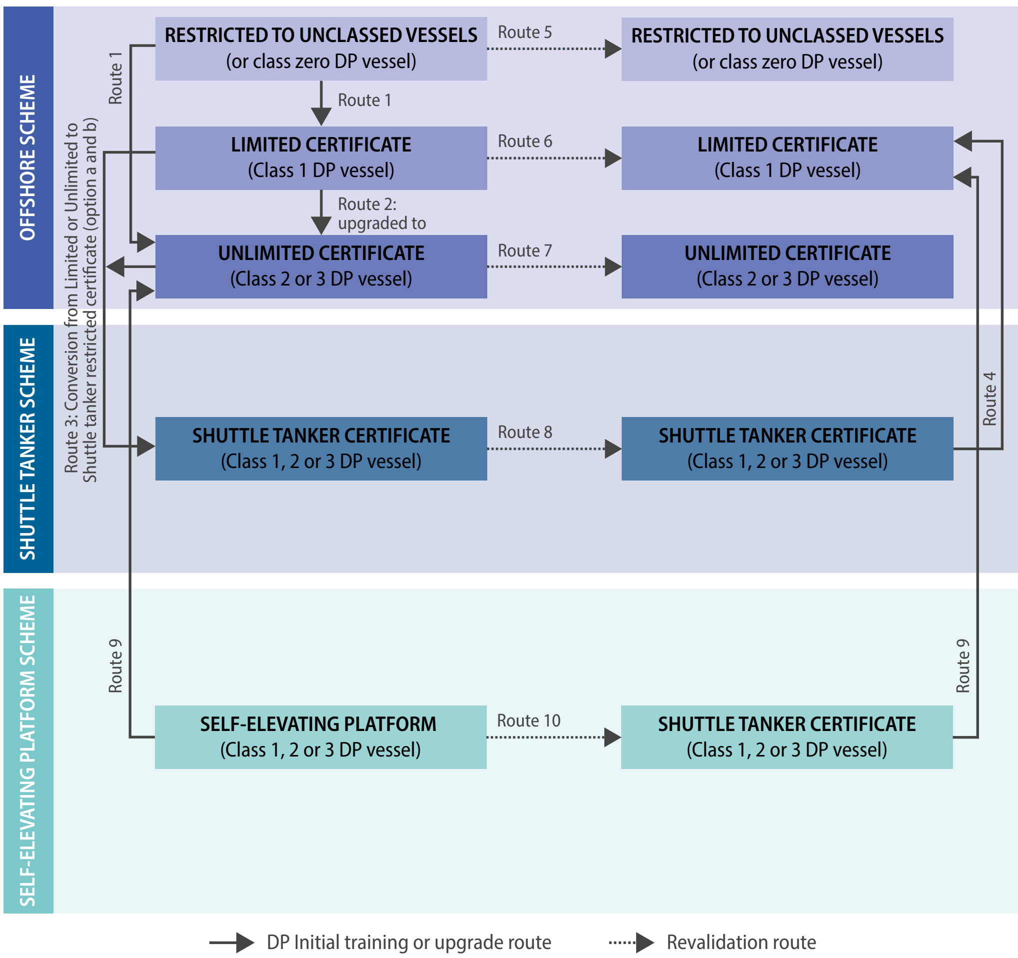
6.1 Validity of DP certificates and revalidation routes

Until 31 December 2014, a DPO's certificate remained valid for as long as the holder regularly operated DP systems. 'Regularly' was defined as a minimum of six months DP watchkeeping experience within the previous five years or work as a DP instructor at an NI-accredited training centre.

Any certificates dated on or before this date that had not been revalidated by 31 December 2019 became invalid from 1 January 2020. Full reference to NI Circular 003/2019 should be made if applicants are unsure how to revalidate from this date.

From 1 January 2015, all DP Certificates issued by The Nautical Institute must be revalidated every five years. Based on STCW standards and best practices, The NI will consider any one of the following routes for revalidation or conversion.

DP INITIAL TRAINING AND REVALIDATION ROUTE



Route 1: Converting from unclassed vessels to limited or unlimited DP certificates

To convert from an Unclassed Restricted Certificate to a Limited or Unlimited Certificate, the trainee DPO must obtain at least 120 DP sea time days onboard a DP1 or DP2/3 classed vessel, complete a new task section, have a Statement of Suitability form signed off by the Master andobtain a confirmation letter from the company. DP1, 2 or 3 classed sea time used in the application before the issue of the Unclassed Restricted Certificate may be reused in the conversion process provided a minimum of 60 DP sea time days is served on the relevant classed vessel after the issue date of the Unclassed Certificate. This DP sea time must be recorded in The NI DP Logbook in the conversion pages. Active DP sea time must account for 75% of sea time gained; the remaining 25% can be passive DP sea time.

When the trainee applies for the removal of the restriction from the certificate, they must send to The NI, along with their application, The NI DP Logbook, a new task section (a printable version can be found on the website), a new Statement of Suitability form signed by the Master of the last Class 1, 2 or 3 vessel, the original Restricted to Unclassed Vessel Certificate and the confirmation letter from the shipping company for the new sea time experience.

The conversion DP sea time training must be logged in The NI DP Logbook, not in any other logbook. The conversion application must be completed through the online system, using the same candidate customer account number that was issued with their first DP Certificate. At the end of this process, The NI will, if appropriate, issue a new Limited or Unlimited Certificate.

The chart below explains how this conversion is calculated by The NI

Example	Initial application where persongained Unclassed Certificate				New DP time presented for upgrade			How much DP sea time this person has done in total onboard classed vessel, summing up time for initial certificate and upgrade? (B+B1+RR+SS)	NI verification of new DP sea time towards Limited/Unlimited certificate	
	DP sea time on unclassed vessel (A)	DP sea time on classed vessel DP1 (B) This is equivalent to TCVDP 1	DP sea time on classed vessel DP2/3 (B1)This is equivalent to TCVDP 23	Total DP sea time (C)	New DP sea time logged on a classed vessel DP1 (RR)	New DP sea time logged on a classed vessel DP2/3 (SS)	Total DP sea time on classed vessels (E)		Result for a LIMITED Certificate a. (B+B1) + (RR+SS) > = 120 days. b. (E) >= 60 days? c. SS>=60 days? d. Certificate issued?	Result for a FULL Certificate a. (B+B1) + (RR+SS) > = 120 days. b. (E) >= 60 days? c. SS>=60 days? d. Certificate issued?
1	90	20	40	150	60	0	60	120	a) Yes b) Yes c) Yes d) Cert. issued	a) Yes b) Yes c) No d) No
2	43	52	40	135	25	20	45	137	a) Yes b) No c) No d) No. Candidate needs another 1 5 days on classed vessel to reach a minimum of 60 days.	a) Yes b) No c) No. Candidate needs another 40 days on classed vessel to reach a minimum of 60 days required for full certificate d) No

3	28	70	30	128	50	28	78	178	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
4	52	28	40	120	24	40	64	132	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
5	80	22	20	122	18	41	59	101	a) No b) No c) No d) No. Candidate needs 19 days on classed vessel to reach a minimum of 120 days	a) No b) No c) No d) No. Candidate needs 19 days on classed vessel to total the 120 days required, being these 19 days to be done on DP Class 2/3 vessel
6	15	65	55	135	0	81	81	201	a) Yes b) Yes c) Yes d) No	a) Yes b) Yes c) Yes d) Cert. issued
7	22	35	63	120	30	5	35	133	a) Yes b) No c) No d) No. Candidate needs 25 days on classed vessel to reach a minimum of 60 days as required	a) Yes b) No c) No d) No. Candidate needs 55 days on classed vessel to reach a minimum of 60 days as required
8	102	21	0	123	40	10	50	71	a) No b) No c) No d) No. Candidate needs 49 more days on classed vessel to total 120 days and 10 to total a minimum of 60 days required for Limited Certificate	a) No b) No c) No d) No. Candidate needs 49 more days on classed vessel to total 120 days and a minimum of 50 days on Class 2/3

9	95	21	39	155	65	0	65	125	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
10	32	80	15	127	45	35	75	175	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
11	50	25	45	130	40	23	63	133	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No
12	35	90	80	205	10	0	10	215	a) Yes b) No c)cNo d) No. Although the candidate meets the 120 days required, another 50 days on a classed vessel is needed to meet the minimum 60 for upgrade	a) Yes b) No c) No d) No. Although the candidate meets the 120 days required, another 60 days on classed 2/3 vessel is needed to meet the minimum for upgrade
13	28	70	30	128	20	55	75	175	a) Yes b) Yes c) No d) Cert. issued	a) Yes b) Yes c) No d) No. Candidate needs another five days to reach a minimum of 60 days on Class 2/3 vessel to obtain the full certificate

Route 2: Upgrade from limited to unlimited certificate

To upgrade from a Limited to an Unlimited Certificate, the DPO will need to record in an NI DP Logbook a minimum of 60 DP sea time days onboard DP2 or 3 classed vessels. Any DP sea time logged onboard DP2 or DP3 classed vessels previously used to obtain a Limited Certificate cannot be counted again, but any other valid sea time on a DP2 or DP3 classed vessel will count for the issuance of an Unlimited Certificate. The NI will implement this on a case-by-case basis.

When applying to upgrade to an Unlimited Certificate, The NI will require, along with the application, the logbook, a new Statement of Suitability upgrade form signed by the Master of the last Class 2 or 3 vessel, the original Limited Certificate and the confirmation letter from the shipping company for the new sea time experience.

The online application for an upgrade should be carried out before sending in the documents listed above to The NI. The applicant must use the same candidate customer account number that was issued prior to their first DP Certificate. Once all qualification requirements have been confirmed, The NI will issue an Unlimited Certificate.

Route 3: Conversion from limited or unlimited to shuttle tanker restricted certificate

DPOs who already hold a Limited or Unlimited Certificate issued by The Nautical Institute and who wish to convert to the Shuttle Tanker Restricted Certificate must follow the process set out in Route 8.

Route 4: Conversion from shuttle tanker restricted certificate to offshore certificate (outside of the revalidation period)

To convert a DP Certificate from Shuttle Tanker Restricted to an Offshore DP Certificate, applicants need to complete Course C (see Annex C) and 90 DP sea time days; they must also provide a signed Statement of Suitability and a company confirmation letter issued after the date of the Shuttle Tanker Certificate. All tasks in the task section would already have been completed as mandatory during the shuttle tanker training and therefore do not need to be repeated for this conversion.

In this case, the type of DP certificate (Limited or Unlimited) will be determined by the class of the vessel on which the DPO has completed their DP sea time. To gain the Unlimited Certificate, the candidate must have undertaken a minimum of 60 DP sea time days onboard a DP2 or DP3 classed vessel.

At the time that the candidate is applying for conversion of the certificates, all the sea time in the logbook must have taken place within the past five years. If any sea time phase is out of date, they will be required to undertake that part of the training again.

Route 5, 6 and 7: Revalidation of 'unclassed' (Route 5), limited (Route 6) and unlimited (Route 7) DPO and DPVM certificates

Please note: For revalidation, DP sea time for Route 6 and 7 must be obtained on a DP classed vessel unless an Unclassed Certificate is held (Route 5) together with one of the CPD options in the Table 1 revalidation matrix.

The following rules apply to revalidating a DP Certificate (Offshore Scheme) that the DPO currently holds. One of the following criteria should be met:

- If the DPO/DPVM has 150 days or more DP sea-time, within a period of five years, then the requirements in Table 1 apply.

Table 1 Revalidation matrix	
1 Jan 2024	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of one year of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2025	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of two years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2026	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of three years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2027	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of four years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2028	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2029	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of The NI-approved CPD programme or complete The NI DP Refresher Course. From 1 January 2029, applicants will receive the standard 3-month indemnity letter once they have submitted and paid for their online application.

- If the DPO/DPVM has 30 days or more DP sea time, The NI DP Refresher Course has to be completed.
- If the DPO/DPVM has no DP sea-time or less than 30 days, they must complete The NI DP Revalidation Course. When revalidating by means of the Revalidation Course for a second or subsequent time, the DPO must follow the rules as per the relevant NI standard with respect to sea time requirements. Refer to Annex F, Section 2.
- If a DP professional has been engaged in an occupation The NI considers to be equivalent to the necessary sea service (ie DP surveyor, DP consultant, DP auditor, DP superintendent, DP supervisor), revalidation of their DP Certificate will require a minimum of 150 days in the activity claimed in the preceding five years. After this, the requirements in Table 1 apply.

- If a DPO/DPVM is an NI-approved instructor, revalidation of their DP Certificate will require a minimum of 150 days in the activity claimed in the preceding five years in addition to sitting The NI online exam.
- The Nautical Institute may also consider any other equivalent activities on a case-by-case basis. These might include writing FMEAs and other DP documents, participating in proving/annual trials, undertaking suitability surveys on DP vessels or carrying out OVID inspections with a DP variant.

In the case of a DP Instructor, proof of these activities must be provided in a confirmation letter signed by an accredited training centre.

In the case of a DP superintendent, DP consultant or DP supervisor, the letter must be signed by the operations manager of the vessel where the person has performed the work/activity or, in the case of a DP auditor, by NI's authorised person. Unless an Unclassed Certificate is held, the sea time for this route must be obtained on a classed vessel.

If the applicant has had a mix of experience in the past five years that involves DP activities and DP sea time days, this experience will be totalled, eg, 20 days DP activities and 130 DP sea time days will equal the required 150 days. However, if the total experience is less than 150 days then the criteria above (for the DPO) must be met. Masters holding a DP Certificate can claim for the DP sea time due to their direct responsibility for, and supervision of, DP operations. In this case, the DP sea time must be recorded in The NI or IMCA logbook, signed and stamped as the DP Master.

Note: Passive DP sea time will not be accepted for revalidation purposes as it can only be counted for initial training in the task section of the logbook.

Note: Holders of non-NI DPO Certificates (such as those issued by NMD, DNV and OSVDPA) are currently eligible to convert to an NI DPO Certificate. The requirement for conversion is the same as for revalidating a NI DP certificate, the applicant will need to have completed a minimum of 150 DP days within the preceding 5 years and be able to provide DP sea time confirmation letters for all eligible sea time before making an online application.

Similarly, if a candidate is part of the way through completing their training with a non-NI certification body but wishes to complete their training on an NI scheme, this will be considered on a case-by-case basis.

Prospective applicants who have specific questions about their eligibility should contact The NI directly for advice.

Position Mooring (PosMoor) or Thruster-Assisted Mooring (TAM): The time onboard a vessel with the classification POSITION MOORING or THRUSTER-ASSISTED MOORING (TAM) and DP class notation can be counted towards the DP sea time obtained for revalidation purposes. DP sea time can be claimed onboard a POSMOOR/TAM DP vessel only when the vessel does not have a mooring system deployed. The company DP sea time confirmation letter must confirm that the time was completed when the vessel did not have a mooring system deployed. If applicable, The NI reserves the right to ask for further and more detailed information, such as a deck log.

Important Notes for DP Operator Certificate Revalidation

Revalidation Period: Revalidated certificates are issued with an expiry date five years after the previous certificate's expiry date.

Proactive Revalidation: It is strongly advised that DPOs initiate the revalidation process as close to their certificate's expiry date as possible. This minimises any potential interruption in the validity of their certification.

Late Applications: While the Nautical Institute will accept late applications while the certificate is already expired, DPOs are solely responsible for ensuring timely submission and meeting all current and future revalidations requirements.

By adhering to these guidelines, DPOs can maintain the validity of their certifications and ensure uninterrupted professional practice

- The Nautical Institute recommends to the industry that only seafarers with a valid DP Certificate to be hired as DPOs on board vessels.
- *The Nautical Institute recommends that DPOs apply for certificate revalidation on or before expiry. However, to accommodate operational considerations, applications may be accepted up to 12 months after the expiry date of the DP certificate.*

Route 8: Revalidation of shuttle tanker restricted certificates

Revalidation of Shuttle Tanker DPO Certificates must satisfy the following criteria:

- Participation in at least 18 offshore loading operations and one set of annual trials (or FMEA) within a five-year period, plus completion of the applicable option in Table 1.
- Participation in fewer than 18 offshore loading operations but more than six within the past five years, Course B must be completed, followed by Phases 3 and 4 of the Shuttle Tanker Scheme and passing The NI Revalidation Course online exam.
- If fewer than six offshore loading operations have been conducted in the five-year period, the DPO should restart the Shuttle Tanker Scheme process at Phase 2 and complete all subsequent phases. Due to conversion, 24 days sea time can be deducted from the requirements of Phase 2, but all offshore loading operations in Pathway A or B must be completed.
- Where these revalidation requirements specify participation in annual trials or an FMEA test within a five-year period, in exceptional circumstances this requirement may be fulfilled by participation in an additional Simulator Course (such as Offshore Loading Phase 3) in lieu of the trials, completed during this five-year period.

Route 9: Conversion from restricted self-elevating platform certificate to the offshore certificate

To convert from a Restricted Self-Elevating Platform DP Certificate to an Offshore DP Certificate, applicants need to complete 60 DP sea time days and provide a new Statement of Suitability form signed off after the DP sea time dates have been completed and after the issue date of the Restricted Self-Elevating Platform DP Certificate. A company confirmation letter will also be required. The tasks do not need to be repeated.

The type of DP certificate will be determined by the class of the vessel on which the DP operator has completed the DP sea time days. This means that a Limited or Unlimited Certificate may be issued. To gain the Unlimited DP Certificate, the candidate must have undertaken the 60 DP sea time days onboard a DP2 or DP3 classed vessel. If the time is completed onboard a DP1 classed vessel, a Limited DP Certificate will be issued.

At the time the candidate applies for the conversion of the certificate, all the DP sea time days in the logbook to be used towards the Table 1 Revalidation Matrix conversion must have been gained within the past five years. However, provided the application is made within three months of the date of signing of the Statement of Suitability, the five years can be counted to the date of signing.

Route 10: Revalidation of restricted self-elevating platform certificates

To revalidate a Restricted Self-Elevating Platform Certificate, applicants need to complete a minimum of 40 DP operations in addition to completing the applicable option in Table 2. The option to complete a Revalidation Course is currently under review.

Table 2 Revalidation matrix	
1 Jan 2024	The holder of a Restricted Self-Elevating Platform Certificate with 40 DP operations who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of one year of The NI-approved CPD programme or complete The NI DP Refresher course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2025	The holder of a Restricted Self-Elevating Platform Certificate with 40 DP operations who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of two years of a NI-approved CPD programme or complete a NI DP Refresher course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2026	The holder of a Restricted Self-Elevating Platform Certificate with 40 DP operations who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of three years of a NI-approved CPD programme or complete a NI DP Refresher course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2027	The holder of a Restricted Self-Elevating Platform Certificate with 40 DP operations who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of four years of a NI-approved CPD programme or complete a NI DP Refresher course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2028	The holder of a Restricted Self-Elevating Platform Certificate with 40 DP operations who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of a NI approved CPD programme or complete a NI DP Refresher course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2029	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of The NI-approved CPD programme or complete The NI DP Refresher Course. From 1 January 2029, applicants will receive the standard three-month indemnity letter once they have submitted and paid for their online application.

6.2 Converting and revalidating from 1 January 2015 while working on shuttle tankers

Those issued with a Limited or Unlimited Certificate by The NI and who do not have sufficient DP sea time days to revalidate their certificates at the end of the five-year period may choose to have their certificate revalidated as a Shuttle Tanker Restricted Certificate. The conditions of Route 8 will apply. Those converting from the Offshore Certificate to Shuttle Tanker Certificate will require a signed Statement of Suitability.

Where these revalidation requirements specify participation in annual trials or a FMEA test within a five-year period, in exceptional circumstances this requirement may be fulfilled by participation in an additional Simulator Course (such as Offshore Loading Phase 3) in lieu of the trials, completed during this five-year period.

All offshore loading operations, FMEA and trials must be confirmed by the company through a confirmation letter. The confirmation letter must be signed by the operations manager or a person of equivalent position.

Note: The DP Certificate issued during revalidation will be of the same type as the certificate initially issued, irrespective of the class of the vessel the candidate has served on within the past five years.

Candidates wishing to remove the limitation on their certificates or who wish to change to the Shuttle Tanker Scheme should take the conversion route to obtain a new certificate from The NI.

For offshore certificate revalidations

Candidates are required to apply for revalidation of their DP Certificate in the same month that the original certificate was issued (as shown on the DP Certificate). The NI will consider extenuating circumstances on a case-by-case basis.

IMCA logbooks can be used towards revalidation only. The hours recorded in an individual's IMCA logbook will be divided by two to arrive at the number of DP days that the person has obtained in the past five years, as shown in the formula below:

(Total number of hours for each embark / 2h) =< X
where X cannot be more than the number of days embarked.

The 2 hours comes from the definition of DP sea time for the offshore industry and applies to all time logged on or after 1 January 2015.

The Nautical Institute

Annex A

DP Induction Course

February 2025 – Version 1

Disclaimer

While every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. Likewise, The Nautical Institute cannot be held responsible for any damage to property or personnel while following these guidelines. This information is produced in good faith, but The Nautical Institute cannot guarantee the accuracy and/or completeness of the information, which is produced for guidance purposes only.

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Document version control

NI DP Induction Course		
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NI DP Induction Course	1	20/02/2025

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1. Introduction

The list of training centres approved for the delivery of these courses may be found on The Nautical Institute's (The NI) website.

The following courses cannot be taken in consecutive weeks (back-to-back) unless they are being repeated. This is because the DP sea time after each course gives the prospective DPO the opportunity to reinforce, consolidate and put into practice skills learned during the courses.

Induction and Simulator Courses must be undertaken within five years of the date of the application and submission of documents to The NI. In the event that any of these courses fall outside of the five-year period, the trainee will be required to repeat the expired course.

2. Minimum Entry Qualification Requirements

On successful completion of both the Induction Course and induction online exam, the trainee DPO will be issued with a NI DP logbook in which the courses, DP sea time, tasks and the Statement of Suitability are recorded. The subsequent DP sea time following the Induction Course provides the opportunity to complete the task sections in the logbook.

The grey logbook is issued to trainee DPOs that started their training after 1 January 2015. Trainee DPOs who have entered into the training scheme before this date or are repeating the Induction Course shall continue to use their existing logbooks. Trainee DPOs who have transferred to the new offshore scheme will also be issued with a grey logbook.

Trainee DPOs attending an Induction Course after 1 January 2015 will only be permitted to count DP sea time gained after attending the course. Applications received at The NI under the old scheme rules will be evaluated and honoured by the previous regulation.

3. Number of Hours

A minimum of 28 hours teaching time is required for this course; if additional time is required to run exams or deal with paperwork, this time shall be added to the 28 hours. It is expected that 80% of the time is spent on teaching DP theory and 20% on practical exercises. Usually the Induction Course is delivered over four or five days. There is an option to deliver the course over a maximum six-week period, with instruction taking place on a given day in each of those weeks. This option is particularly suited to cadet training institutions as it allows the training to fit into its existing class schedule. In all other aspects the course must conform to all other training scheme standards.

4. Ratio of Students/Instructors/Equipment

The number of students attending the Induction Course must be regulated so that each student obtains sufficient hands-on experience of operating the system to ensure adequate familiarisation with the principles of DP operation. In order to achieve this, The NI allows a maximum of eight students per class being taught by one instructor. If more than eight students are enrolled on the course, a second instructor will be required to assist with practical exercises. In this case, the name and signature of the second instructor should be reflected in the attendance list of the course and practical exercises.

Centres are allowed to seat two students per DP console, which is sufficient to reconcile the availability of equipment and the need to provide sufficient hands-on experience. If this is the case, the ratio for the Induction Course is one instructor to eight students and four DP consoles.

5. Delivery Method

At the start of the Induction Course The NI DP Operator training scheme is to be outlined, including the need to maintain the logbook and the procedure for obtaining a DP Operator Certificate.

The Induction Course is predominantly theory-based with guided practical exercises that introduce the trainee to various DP operational modes. The topics to be covered on the Induction Course are to include:

5.1 General principles of dynamic positioning.

5.2 The elements of a DP system:

i. Computers and control elements.
ii. Position reference systems.
iii. Heading reference systems.
iv. Wind sensors and other environment reference systems.
v. Power generation elements and the UPS.
vi. Thrusters and manoeuvring systems.

5.3 Position reference systems and other sensors; their principles of operation, their use, operational merits and limitations.

5.4 Practical demonstration and operation of a typical DP system.

5.5 DP vessel operations: hazards associated with certain types of operation, eg shallow water and strong tides.

5.6 Power generation, distribution and management.

5.7 DP watchkeeping and watch handover procedures, documentation and communications.

The practical element of this course requires the use of a DP system installed in the training centre and delivered with an adequate level of simulation. This equipment must meet the requirements set out in Annex 5 of the Accreditation and Certification Scheme Standard Volume 2. The minimum equipment required for the Induction Course is Class C simulators.

6. Course Aims

At the end of the course the student should:

a. Know the principles of DP.
b. Have a basic understanding of how to set up a DP system.
c. Have an understanding of the practical operation of associated equipment, including position reference systems.
d. Be able to recognise the various alarm, warning and information messages.
e. Be able to relate the DP installation to the ship system, including (but not limited to) power supply, manoeuvring facility, available position reference systems and nature of work.
f. Be able to relate DP operations to the existing environmental conditions of wind, sea state, current/tidal stream and vessel movement.

7. Course Objectives

The following is a list of the objectives to be attained by trainee DPOs by successful completion of the Induction Course.

By the completion of the training session or period for the <u>DP control station</u> the trainee should be able to:

7.1 Define Dynamic Positioning.

7.2 Explain the need for Dynamic Positioning in various types of vessel.

7.3 Describe the six freedoms of movement of a vessel.

7.4 State which of the six freedoms of movement are controlled under DP and which are monitored.

7.5 Describe the following aids to manoeuvring commonly fitted to DP vessels, including their practical and operational advantages and disadvantages: fixed and controllable-pitch propellers, azimuth thrusters, Azipod thrusters and tunnel thrusters.

7.6 List the seven main components of a DP system; DP operator, DP computer (or controller), DP operator station, position reference systems, sensors, power supply and thrusters.

7.7 Describe the various modes of DP operation, including manual control, semiautomatic control and automatic control. In addition, describe the following common specialist functions: ROV follow (follow sub), follow target, track follow (auto track), minimum power (weathervane) and riser angle mode.

7.8 Discuss the concept of mathematical modelling of vessel behaviour characteristics and appreciate the advantages and limitations/disadvantages of this technique.

7.9 Outline the power requirements of a DP vessel system and describe a typical diesel-electric power installation.

7.10 Describe the following position reference systems commonly associated with DP installations: INS, Differential GNSS, hydro acoustic, taut wire, Artemis, FMCW radar and laser-based systems.

7.11 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyrocompass, wind sensor (anemometer) and manual draught input sensor.

7.12 Describe the concept of centre of rotation and the provision of alternative centres of rotation.

7.13 Describe consequence analysis as carried out by a Dynamic Positioning system.

By the completion of the training session or period, for the power generation and management the trainee should be able to:

7.14 Describe the power generation and distribution arrangements in a typical diesel-electric DP vessel, with particular reference to system redundancy as described in IMO MSC Circ. 645, 1580 and vessel FMEA.

7.15 Describe the power supply and distribution arrangements in a typical hybrid diesel/diesel-electric DP vessel. (Main CPP or direct-drive azimuth thrusters)

7.16 Recognise the power requirements of DP vessels and explain the concept of available power and spinning reserve in worst case failure.

7.17 Describe the functions of a power management system as installed on Class 2 and Class 3 DP vessels.

7.18 Describe the provision of uninterruptible power supply to the DP system, with particular reference to power shortages, failures and system redundancy.

By the completion of the training session or period for the propulsion units the trainee should be able to:

7.19 Describe the following types of propulsion system commonly installed in DP equipped vessels: for example, main propellers and rudders, azimuth thrusters, Azipod thrusters and tunnel thrusters, waterjet and Voith Schnieder propellers.

7.20 Describe the importance of monitoring the displayed values of setpoint and feedback data for thruster and propeller rpm, pitch and/or azimuth.

7.21 Describe the operational characteristics and common failure modes of the different types of propulsion systems as described in 19 above.

By the completion of the training session or period for the position reference systems (PRS) the trainee should be able to:

7.22 Describe the operation of hydroacoustic position reference (HPR) systems.

7.23 Describe the principles of position-fixing using underwater acoustic systems working in SSBL/USBL, LBL and SBL modes.

7.24 Describe the various types of hydroacoustic beacon: transponder, responder and pinger/beacon.

7.25 Describe the layout of a typical hydroacoustic system including operator station, transceiver, transducer pole and transducer.

7.26 List the operational advantages and limitations of acoustic systems as a position reference for DP.

7.27 Describe the principle and operation of the Artemis position reference system.

7.28 List the operational advantages and limitations of the Artemis position reference system.

7.29 List the different types of taut wire position reference system: vertical lightweight, vertical deep water, vertical moon pool, horizontal and horizontal gangway.

7.30 Describe the display of taut wire reference data in the DP system.

7.31 Describe the principle of position reference using the taut wire system.

7.32 List the advantages and limitations of the taut wire position reference systems.

7.33 Describe the principles of the Differential GNSS (DGNSS) system.

7.34 Outline the operation of a typical commercial DGNSS network where corrections are delivered by satellite communications.

7.35 List the sources of error and inaccuracy associated with the DGNSS system, describing the effects on the quality of positioning.

7.36 List the available quality data associated with the DGNSS system.

7.37 List the advantages and limitations of the DGNSS system when compared with other PRS.

7.38 Describe the principles used in relative DGNSS systems.

7.39 Describe the principles of position reference using laser-based systems.

7.40 Outline the method of setting up a laser system to provide best position information.

7.41 List the advantages and limitations associated with a laser-based PRS.

7.42 Describe the principles of position reference using FMCW radar-based systems.

7.43 List the advantages and limitations associated with FMCW radar-based PRS.

7.44 Describe the principle of Inertial Navigation Systems (INS) and the methods of using INS to enhance existing PRS performance.

7.45 Discuss the relative accuracy and reliability of PRS, together with the methods used to apply weighting and pooling and voting when more than one PRS is used. Median rejection of PRS when three or more are used and the importance of monitoring the position reference page.

7.46 Describe other PRS that may be used in conjunction with a DP system.

By the completion of the training session or period for the <u>heading and motion reference systems</u> the trainee should be able to:

7.47 Describe the function of gyro compasses and their redundancy within a DP system.

7.48 Describe how to obtain pitch, roll and heave information for input into a DP system.

7.49 Describe the reason for inputting pitch, roll and heave into a DP system.

By the completion of the training session or period for the <u>environmental reference systems</u> the trainee should be able to:

7.50 Describe the provision of wind sensors within the DP system.

7.51 Describe the wind feed-forward facility and its importance within the DP system.

7.52 Recognise the limitations of wind sensor inputs. Explain the reasons for and the consequences of deselecting wind sensor inputs.

7.53 Describe the method by which the DP system determines the value for DP current or Sea Force (the residual error resulting from unmeasured errors & unmeasured forces acting on the vessel).

7.54 List the reasons for discrepancy between the displayed value of DP current (or Sea Force) on the DP system and the true current or tidal stream value.

By the completion of the training session or period for the external force reference systems the trainee should be able to:

7.55 Describe the use of external force reference systems such as hawser tension, plough cable tension and pipe tension monitoring.

By the completion of the training session or period for the DP operations the trainee should be able to:

7.56 Describe the procedures to be followed when approaching a worksite and transferring from conventional navigation to DP control.

7.57 Discuss the need for completing pre-DP and other checklists prior to and during DP operations.

7.58 Explain the need for keeping logbook records of all DP operations, failures and incidents.

7.59 Explain the need for keeping records of operation, maintenance and repairs of DP and ancillary equipment.

7.60 Describe the need for effective communications during the conduct of DP operations.

7.61 Outline the procedures to be followed by the DPO when taking over the control of the vessel's positioning and manoeuvring.

7.62 Describe the structure of alarm/warning and information messages provided on the DP system displays and on the DP printer.

7.63 Recognise the alarms/warnings associated with loss of redundancy after worst case failure and the possible loss of heading or position if another failure occurs after a worst case failure (part loss of some thrusters and power) and catastrophic failure (loss of heading and/or position control). ASOG, TAM and CAM.

7.64 Outline the navigational projections, spheroids and datums that may be used in operations involving Dynamic Positioning.

7.65 Explain the use of worksite diagrams using Universal Transverse Mercator (UTM) coordinates.

7.66 Explain the need for planning DP operations, including emergency and contingency situations ASOG, TAM and CAM.

7.67 List the various following providers of documents containing statutory requirements and guidance relating to DP operations, including:

7.68 MO (including IMO MSC/Circ. 645 of 1994 and 1580 of 2017 Guidelines for Vessels with Dynamic Positioning Systems).

7.69 Classification society DP rules (example from classification society which is member of IACS)

7.70 International Marine Contractors Association (IMCA).

7.71 Marine Technology Society (MTS).
Explain the purpose of documentation associated with DP operations, such as DP operations manuals, Failure Modes and Effects Analysis (FMEA) and capability plots. ASOG, TAM and CAM. Describe the IMO (DP) equipment classes and their application, with reference to the IMO Guidelines for Vessels with DP Systems. Understand that classification societies use either numbers (eg ABS DPS-2) or letters {eg Lloyd's Register DP (AA) to denote the DP Class allocated to the vessel. Describe in outline the DP operations conducted by the following vessel types:

7.72 Diving and underwater support vessels.

7.73 Drilling ships and semi-submersibles.

7.74 Cable lay and repair vessels.

7.75 Pipelay vessels.

7.76 Rock dumping and dredging vessels.

7.77 Shuttle tanker and FPSO/FSO operations.

7.78 Flotel (accommodation) vessels.

7.79 Crane barges and construction vessels.

7.80 Anchor-handling and platform supply vessels.

7.81 Cruise ships and luxury yachts.

7.82 State and describe the hazards associated with DP operations conducted in areas of shallow water and/or strong tidal conditions.

7.83 Describe the hazards associated with DP operations in very deep water.

By the completion of the training session or period for the practical operation of a DP system the trainee should be able to:

7.84 Demonstrate the use of the joystick to manoeuvre the vessel and bring the vessel to a stop in a seamanlike manner.

7.85 Demonstrate the correct procedure for setting up the DP system in both manual and automatic modes.

7.86 Demonstrate position and heading change manoeuvres, using both automatic and manual DP facilities.

7.87 Demonstrate the use of commonly provided functions on the DP control panel. As a minimum, including Gain, Fixed Azimuth mode and Thruster bias.

7.88 Demonstrate the use of common modes found on a DP system, as a minimum Track Follow, Minimum Power and ROV Follow.

8. Course Assessment

Not Applicable

9. Online Assessment

In order to be awarded a certificate of completion for the Induction Course the trainee must pass an online assessment at the training centre. The exam is composed of multiple choice questions and shall be completed in 1 hour 15 minutes. The online assessment will consist of 40 questions and shall be completed with a pass mark of 70%.

Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. Failing these three initial attempts, the student is required to repeat the Induction Course and undertake the assessment again.

On successful completion of the Induction Course and online assessment, the trainee Dynamic Positioning Operator will be issued with a Nautical Institute Dynamic Positioning Operator's logbook in which their courses, DP sea time, task completion and Statement of Suitability as a DPO are recorded.

10. Practical Assessment

Not applicable

11. Blended Learning for Induction Course Only

Definitions:

- CBT: Computer-based training; a computer course that completely replaces face-to-face training.
- Blended learning: a methodology that combines CBT with face-to-face and/or practical training.

CBT courses are not recommended for DP courses because the trainee DPO must learn skills that cannot be taught via computer only, including communication, delegation and emergency response. Trainee DP Operators learn from each other during a face-to-face course as they participate in discussions and debrief after exercises.

Blended learning can be accepted as a delivery method for the DP Induction Course only, not the Simulator Course. CBT may be used to deliver the theoretical portion of the Induction Course after which a minimum of two and a half days will be required in a traditional class. At least two full days should be used for exercises, not theory, and a half day should be used to administer the external online assessment.

The course must comply with the aims and objectives and shall be assessed by The NI on a case-by-case basis.

During the CBT portion of the course, computer assessments for each unit of material covered will be administered to verify that the trainee understands that material. The pass mark will be 70% for these interim assessments. Once the CBT is complete, the training centre shall administer a further assessment to ensure that the trainee is ready for the practical portion of the course and is at a level of understanding aligned with other trainees in the class.

One instructor should be allocated to support each student and support should be given seven days a week and cover all parts of the world.

Training centres are entitled to set appropriate limits on the time that trainees may allow to elapse between the remote and classroom portions of their training, if they wish. However, these must be aligned with their own terms of reference and be set with fair consideration for the professional restrictions of seafaring DPOs.

12. Online Induction Course (Theory Part)

The NI DP Induction Course comprises 80% of theory and 20% practical training.

The training centres that wish to deliver the induction course's online theory, must seek and receive approval from The Nautical Institute.

Documentation to submit to The Nautical Institute for approval:

1. Details of the instructors to be used for online learning.
2. Timetable for online course delivery and practical training at the training centre.
3. Details of how learning materials will be provided to the candidates.
4. Details of the delivery methodology, including online learning platforms.
5. Details of the required equipment needed by the trainee DPO at the remote location.
6. Confirmation of the arrangements for the training and assessment before commencement of practical training of Induction course at the training centre.

The trainee DPO must return to the training centre within three months after completion of the online theory lessons to complete the induction course in its entirety. The course certificate and logbook should be handed to the candidate upon completing the course and passing an online exam.

The NI will not accept any sea-time until the candidate completes the induction course theory, practical and online exam.

The Nautical Institute reserves the right to review the online course delivery from time to time. If the online course delivery is found to be sub-standard, The NI will revoke the approval.

LESSON PLAN No. 1 (Sample)		
Course Title	**Dynamic Positioning (Induction)**	
Day and Session	Day 1 – Session 1	
Topic/Lesson	Introduction to the concept of DP	
Aims	1. To introduce Dynamic Positioning concept in floating vessels. 2. To describe the utility of DP in different type of vessels. 3. To describe the seven elements of DP. 4. To introduce six degrees of freedom in DP.	
Objectives	On completion of this session the participants will have gained: a. An understanding of concept of DP and how it helps different types of vessels in performing their operation. b. An insight of the seven components of DP and how each component plays its part in DP operation. c. An understanding of six degrees of freedom and how DP controls three degrees of freedom to maintain vessel position.	
Total Time	**Content/Activity**	**Training Aids**
1 hr	Introduction to the concept of DP	
15 mins	Specific Content of the Lesson: 1. Concept of Dynamic Positioning: a. Definition of DP. b. Brief background of need to have DP for offshore operations. c. What type of vessels use DP system.	1. Film/video. 2. Projector and Power Point Presentation No.1. 3. White board and marker pen. 4. DP simulator.
20 mins	2. The seven components of DP, their brief description and role in DP operation: a. Operator. b. HMI – Human Machine Interface. DP Console and Independent Joystick. c. DP Controller. d. Sensors. e. Position Reference Systems. f. Power Plant. g. Thrusters.	1. Projector and Power Point Presentation No. 2. 2. White board and marker pen. 3. Sensor models. 4. PRS models. 5. DP simulator.
20 mins	3. The six degrees of freedom of a vessel: a. Describe roll, pitch, heave, surge, sway and Yaw movements of the floating vessel. b. Explain that only surge, sway and yaw can be controlled by DP by use of sensors, PRSs and thrusters. c. Briefly explain through line diagrams on how surge, sway and yaw are controlled by DP.	1. Film/video. 2. Projector and Power Point Presentation No. 3. 3. White board and marker pen. 4. DP vessel model.
05 mins	4. Summing up and question / answers.	As required.

The Nautical Institute

Annex B

DP Simulator Course

February 2025 – Version 1

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Document version control

NI DP Simulator Course		
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NI DP Simulator Course	1	20/02/2025

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1. Introduction

DP Simulator Course has a three-part assessment process:

1.1 DP Set-Up Practical Assessment, undertaken as the course progresses. This must be successfully completed and competence to perform tasks is a requirement to pass the course.

1.2 Online Exam at completion of course which needs to be passed.

1.3 Formative Assessment, which is feedback given to students throughout the course. This may vary from centre to centre but should consist of:

i. briefing, consisting of Scenario Objects (SMART) and feedback criteria (how to measure a participant's obtaining a correct level)
ii. debriefing, consisting of two parts, feedback from students and feedback from the instructor, specifically after simulator exercises.

The debriefing note from the instructor must be retained for a period of at least three years.

2. Minimum Entry Qualification Requirements

The course is a key element of the DPO training programme. As such, participants will have completed the Induction Course and gained the specified experience before enrolment.

3. Number of Hours

A minimum of 28 hours teaching time is required for this course; if additional time is required to deal with paperwork or administer exams this time shall be added to the 28 hours. It is suggested that a split of 30% of the course time is spent on theory and 70% on practical exercises (including the time spent on briefing and debriefing).

4. Ratio of Students/Instructors/Equipment

The number of students attending the Simulator Course must be regulated so that each student obtains sufficient hands-on experience of operating the system when having to react to various failure scenarios. In order to achieve this, The NI allows a maximum ratio of four students taught by one instructor per one Class B or A Simulator.

By exception, and where justified, a ratio of five or six students may be considered at the discretion of The NI's Accreditation Team, based on the number of simulators in place, rotation of students and the use of the training methodology in place.

When two simulator systems are available in a training centre, "best practice" is to keep each trainee on the same simulator throughout the Simulator Course.

5. Delivery Method

The training will be predominantly practical/operational in nature. Exercises and case studies will be carried out in a facility that meets the provisions set out in the document NI DP Simulator specification (Annex 5 of the Accreditation and Certification Standard Volume 2).

In addition to exercise briefing/debriefing, students will be given an opportunity to give feedback on their training needs during classroom tuition.

This course is intended for those who have completed the Induction Course and a minimum of 60 DP sea time days. These students should already have a good grounding in the practice and principles of dynamic positioning through their experiences in class and at sea.

The DP Simulator Course is intended to build on that experience and to provide realistic DP-based scenario work. These scenarios should provide the opportunity to practice all aspects of the planning and conduct of typical DP operations, including the handling of emergencies. Particular emphasis should be placed upon teamwork within the role-play scenarios.

A typical installation will consist of a redundant DP system interfaced with a simulator system coordinated by the instructor's input. Other facilities will include a realistic communications suite, suitable chartroom facilities and support documentation.

DP scenarios must closely match the situation onboard a vessel. Communications form an important part of any DP situation, so they must be adequately simulated in any training facility, with several different means of communication between the instructor station and the DPO/trainee facility. Communications to be simulated include:

- VHF on emergency and working channels. A useful addition is a listing of the various channels monitored by the various installations and vessels taking part in the simulations.
- Talk-back to areas such as ROV control, dive control.
- Telephone to areas such as the MCR.
- DP status alarms (red, amber, blue/white and green traffic lights).
- DP status board. This facility may form part of a planned crisis; the instructor may mark up the status board incorrectly at the beginning of a scenario to discover if the trainees are completing their checklists meticulously.

The training establishment must provide materials to support the hardware simulator facility. This will mainly consist of relevant documentation which will include:

- Plans and drawings showing the oilfield or operating area used in the simulations.
- Drawings of the various installations within the operating areas, together with any specifications or other necessary details.
- Drawings and data sheets relating to the vessel or vessels under simulation; these drawings to include DP capability plots.
- Operational instructions, checklists and standing orders associated with the vessel or vessels.
- A set of scenario information sheets. Each scenario should be designed to provide at least one specific, planned crisis or problem for the trainees to react to. Other problem areas should be kept in hand for use in the event of the trainees coping with the primary planned crisis in short order.

Training centres must ensure all sources of time keeping are aligned and synchronised. Especially for the recording of time during DP Simulator based exercises.

6. Course Aims

On completion of the Simulator Course the student should be able to:

6.1 Carry out operational planning, risk assessment and hazard identification tasks.

6.2 Set up the DP system for a particular task.

6.3 Operate the communications.

6.4 Analyse the trends.

6.5 Discuss systems failures.

6.6 Decide on courses of action because of systems failures.

6.7 React to alarms and printer readout.

6.8 Initiate DP alert status alarms.

6.9 React to all events occurring.

6.10 Operate the desk under normal and pressured conditions.

6.11 Practice effective teamwork.

6.12 Apply the lessons learned to date.

6.13 Act in line with the appropriate Area-Specific Operating Guide (ASOG)

7. Course Objectives

Operation and DP System

7.1 Demonstrate ability through participation in exercises to set up, operate and carry out manoeuvres using the DP system under the following control modes:

Manual mode	Joystick control of surge, sway and yaw.
Mixed manual/ automatic mode	Automatic control of yaw with joystick control of surge and sway. Automatic control of surge and sway with joystick control of yaw.
Automatic mode	Automatic control of surge, sway and yaw.

7.2 Demonstrate ability through group exercises to set up, operate and carry out manoeuvres using the DP system under the following control modes:

Follow-target mode	ROV follow and working other DP vessels.
Track follow mode	Vessel following a setup of waypoints.

7.3 Demonstrate within the DP Simulator the operation of position reference systems, sensors and peripheral equipment associated with the DP system.

7.4 Understand the operation of heading modes where the DP system continuously determines and automatically sets vessel heading to minimise power/thrust requirements.

DP Operation

7.5 Interpret vessel plans and specifications.

i. Interpret information found on paper or electronic field charts relevant to the planning and conduct of DP operations.

7.6 Using vessel and other data such as capability plots (paper or electronic), footprint plots to assess the capability of the vessel to complete successfully any proposed operation without a loss of position after worst case failure.

7.6.1 Review power management systems considering the following:

i. Open and closed tie breaker.
ii. Number of generators online.
iii. Available Power/Spinning reserve.
iv. Preferential tripping- /-Load sharing.
v. Redundancy.
vi. Concept of auto blackout recovery.
vii. How power management systems prevent blackouts.
viii. Power management with the DP programme.

7.6.2 Review FMEA and Annual DP Trials:

i. Define the two main sections of an FMEA.
ii. Explain reason why Class 2 and 3 vessel need FMEA.
iii. Identify Worst Case Failure.
iv. Explain the reason for using the FMEA to develop Activity Specific Operation Guidelines (ASOGs).
v. Identify and understand the reason for annual DP trials.

7.7 Carry out a risk assessment exercise on proposed operations and determine the level of redundancy appropriate.

7.7.1 Understand a DP alert table or ASOG and what will trigger a change of status and the action required.

7.7.2 Understand CAM and TAM tables and decide on which mode to operate under, based on a risk assessment of proposed operations.

7.8 Make appropriate contingency plans to cover foreseeable system failure or operational requirement. Contingency planning to include:

7.8.1 Escape routes.

7.8.2 Position reference failures.

7.8.3 Sensors.

7.8.4 Weather.

7.8.5 Power.

7.8.6 Propulsion.

7.8.7 Worst case failure.

7.9 Describe appropriate procedures to be followed when approaching a work site and transferring from manual/ joystick to DP control, taking into account:

7.9.1 Speed.

7.9.2 Distance.

7.9.3 Drift test.

7.9.4 Location of surface and sub-sea structures.

7.9.5 Drift-on/drift-off.

7.9.6 Testing manual control.

7.9.7 Independent joystick control.

7.9.8 Current/tide changes.

7.9.9 Weather forecasts.

7.9.10 Worst case failure testing.

7.9.11 Testing of the DP alert status system.

7.10 Demonstrate effective completion of set-up/location and change of watch checklists and task specific checklists as required.

7.11 Demonstrate the effectiveness of closed-loop communications needed during DP operations and task-specific communications as per IMCA M103-Guidelines for the design and operation of dynamically positioned vessels, for the exercise being conducted.

7.12 Conduct vessel positioning manoeuvres and station keeping functions following operational plans and procedures.

7.13 Organise DP watchkeeping procedures:

7.13.1 Manning of DP console.

7.13.2 Maintaining lookout.

7.13.3 Internal and external communications.

7.13.4 Observing recognised safe working practices.

7.14 Conduct appropriate watch handover procedures, to include but not limited to:

7.14.1 Status board.

7.14.2 Weather forecasts.

7.14.3 Vessel status.

7.14.4 DP status.

7.14.5 Field operations.

7.14.6 Vessel operations.

7.14.7 Completing appropriate checklists.

7.15 Maintain the appropriate logbooks and records pertaining to DP operations including IMCA incident report forms, fault logs, position reference systems logs.

7.16 Evaluate the various information, warning and alarm messages communicated to the operator.

7.17 Relate the content of the messages in 7.5 above to the actions necessary in relation to the DP operation.

7.18 Understand Activity Specific Operational Guidelines.

Emergency Procedures

7.19 Recognise the conditions (as per main headings in failure mode check list – see final section of this annex – thrusters, sensors, position references, power, environment and miscellaneous) that will degrade operational or emergency status.

7.20 Recognise the warnings and alarms associated with conditions as per 7.19.

7.21 Evaluate the various factors to be taken into account subsequent to any system failure, determine and carry out appropriate corrective actions, including:

7.21.1 Changing DP status.

7.21.2 When to terminate work.

7.21.3 Monitoring stability of position and heading.

7.21.4 Communication.

8. Course Assessment

Each candidate is required to demonstrate their competence to perform the tasks listed in the DP Set-up Practical Assessment Table.

The Control Sheet establishes the conditions under which the practical assessment occurs and the criteria against which the student's performance will be measured.

8.1 The Simulator Assessment Form for the practical assessment is to be used by the instructor/assessor when conducting assessments of the practical skills demonstration on the simulator.

8.2 The instructor/assessor will observe how the candidate demonstrates the skills listed in The NI's DP Set-up Practical Assessment Table and determine if the candidate passes or fails.

Re-Test Policy

The DP Set-up Practical Assessment may not be retaken; it must be passed on the first attempt. If the test is failed, the student must repeat the Simulator Course.

9. Online Assessment

In order to be awarded a certificate of completion for the Simulator Course, the trainee must pass an online assessment at the training centre. The exam is composed of multiple-choice questions and shall be completed in 1 hour. The online assessment will consist of 30 questions and shall be completed in one hour with a pass mark of 70%.

Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. Failing these three initial attempts, the student is required to repeat the Simulator Course and undertake the assessment again.

10. Practical Assessment

Assessment

Each candidate is required to demonstrate their competence to perform the tasks listed in the DP Set-up Practical Assessment Table.

The Control Sheet establishes the conditions under which the practical assessment occurs and the criteria against which the student's performance will be measured.

10.1 The Simulator Assessment Form for the practical assessment is to be used by the instructor/assessor when conducting assessments of the practical skills demonstration on the simulator.

10.2 The instructor/assessor will observe how the candidate demonstrates the skills listed in The NI's DP Set-up Practical Assessment Table and determine if the candidate passes or fails.

11 Failure Mode Checklist

<table>
<tr><td colspan="2">The Nautical Institute
DP Simulator Course</td><td colspan="3">Course dates:
From:
To:
Instructor:</td></tr>
<tr><th>No.</th><th>Failure Mode (Thrusters)</th><th>Corrective Action
Note: Corrective actions, indicated below, should be applied with due consideration to the circumstances of each case.</th><th>Completed</th><th>Exercise No.</th></tr>
<tr><td>1</td><td>Most useful thruster, or any thruster, fails to 100% pitch/rpm. (Feedback indicates 100%)
Alternatively fail to 100% but have feedback indicate differently (i.e. - 50% or other).
Possible (depending on vessel model in use):
a. Fail main engine full ahead.
b. Fail main engine full astern.
c. Fail tunnel thruster to full.
d. Fail azimuth thruster to full.
e. Fail azimuth thruster to full, with feedback indicating direction 180° opposite to actual.
f. Fail thruster to full, with feedback frozen at value seen before failure.</td><td>Detect fault. Emergency stop Thruster. (Deselection of thruster does not stop thrust.) Consider vessel capability after failure/loss of thruster and take action, as required. Update DP Status, as required.</td><td></td><td></td></tr>
<tr><td>2</td><td>Most useful thruster, or any thruster, feedback indicates 100% pitch/rpm but thruster is working normally. Could also set faulty feedback value to less than 100%.</td><td>Detect fault. Is heading or position changing? Emergency stop thruster, if required. (Deselection of thruster does not stop thrust.) If thruster is not stopped (DP continues to operate thruster) stop operation, move to safe location and check thruster. Consider vessel capability after fault and take action, as required. Update DP Status, as required.</td><td></td><td></td></tr>
</table>

3	Most useful thruster (or any thruster) fails to a value between 1% & 99% pitch/rpm. (Feedback indicates failed value). Alternatively fail to value but have feedback indicating a different than failed value.	Detect fault. Is heading or position changing? Emergency Stop thruster, if required. (Deselection of thruster does not stop thrust.) If thruster is not stopped (DP continues to operate thruster) stop operation, move to safe location and check thruster. Consider vessel capability after fault and take action as required. Update DP Status, as required.		
4	Most useful thruster (or any thruster) fails to 0% pitch/rpm	Consider vessel capability after loss of thruster. Take action as required. Update DP Status, as required.		
5	Operator deselects thruster for engineering purposes (request from E/R) engineer trips another (critical) thruster.	Detect mistake. Inform engine room. Determine effect of the loss of this thruster has on vessel capability. Update DP Status, as required.		
6	Thruster having setpoint or feedback error. The magnitude of the error can be set to either cause a thruster alarm or be set so that the error is below alarm limits and only detectable by DPO observation of setpoint/feedback data. (Possibly azimuth 180° off setpoint.)	Detect fault. Consider vessel capability. Have thruster checked and take corrective action as required. (Non-alarm event might not be noticed by DPOs.) The DPO must monitor the thruster setpoint/feedback and understand the information.		
7	Freeze a thruster (setpoint) after the vessel has settled on position and heading. (If a good model has built up there may be no alarm until weather conditions change or a move is input.)	Detect fault. (There may be no alarm if weather conditions are constant and the current model is built up.)		
8	Present a situation where a thruster/thrusters is down for maintenance. Vessel has sufficient remaining thrusters to hold position and complete the task assigned. However, when ½ partial blackout occurs, there will be insufficient thrusters online to maintain position control. (Vessel does not have redundancy with thruster/thrusters down.)	Project should not progress until adequate thrusters are available.		

9	Any of the thrusters down for maintenance. No effect on redundancy.	Consider effect of thruster loss on vessel capability.		
10	Downline, umbilical, cargo hose, etc.., fouls a thruster causing it to fail.	Consider vessel capability after loss of thruster. Update DP Status, as required. Emergency Stop of the Thrusters to limit any further damage.		
11	ROV power failure while underneath vessel. ROV has sufficient tether out to reach surface and has positive buoyancy. Vessel may be secured/connected to bottom by a pipe, cable or umbilical.	Shutdown thrusters or move vessel (as required) to prevent ROV contacting thrusters. Give consideration to DP operation and redundancy while doing so. (Was umbilical length considered during planning of operation? Does ROV have positive or negative buoyancy?) Update DP Status, as required.		
12	Thrusters in fixed azimuth mode, in light weather conditions. Increase environmental loads to the point where vessel will not maintain position in fixed mode. **Note:** Not possible if the simulated vessel doesn't have a fixed azimuth mode.	Thrusters should be switched to free slew as required to prevent loss of position.		
No.	**Failure mode (Sensors)**	**Corrective action**	**Completed**	**Exercise No.**
13	Wind sensor shielded by platform and then sees an increase in wind (15 knots) after vessel move. (Wind increase can vary.)	Position vessel at a distance from platform such that excursion caused by an increase in wind will not cause a collision. (Be aware that the wind sensor is not registering actual wind.)		
14	Wind sensor sees an extra wind (50 knots) for a short period due to helicopter arrival.	Deselect wind sensor before helicopter arrival. Reselect after departure. **Note** some DP systems will just reject the wind from the system, this is a problem if the wind is from a storm front.		
15	False high wind reading registering in DP system (wind sensor sending higher speed to DP than actual wind). Possibly input false reading of 88 knots or other.	Ascertain real order of magnitude of wind, deselect winds ensors, and monitor any vessel movement and correction.		

16	Anemometer fouled (possibly by halyard). Gives fixed wind direction and speed error.	Determine cause of fault. Initiate action to have fault corrected.		
17	Single anemometer failure.	Initiate repairs. Check remaining anemometer/ anemometers, for quality of data, to determine if operation can continue.		
18	Selected gyro drifting slowly; three gyros online.	Investigate gyro error. (If all three gyros are selected, voting should eliminate faulty gyro.) Update DP Status, as required.		
19	Selected gyro drifting slowly; two gyros online.	Investigate gyro error. Attempt to determine which gyro is in error. (If difference becomes too large and faulty gyro cannot be determined, consideration must be given to stopping DP operations.) Update DP Status, as required		
20	Single gyro failure	Consider effect on redundancy. Initiate repairs. Check remaining gyro/gyros. Update DP Status, as required.		
21	Fail gyros (dependent on number selected) to cause position dropout/ model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location, if required. Update DP Status, as required.		
22	Motion sensor selected jumps 5° static angle. (Jump magnitude can vary.)	Investigate alarm. Determine effect, if any, sensor fault has on position references. Update DP Status, as required.		
23	Single motion sensor failure.	Consider effect on redundancy. Initiate repairs. Check remaining sensors. Update DP Status, as required.		
24	Incorrect draught input. Either incorrect manual draught input or draught sensor error.	Detect error and take appropriate action to ensure correct input.		

No.	Failure mode (Position references)	Corrective action	Completed	Exercise No.
25	A perfect (frozen) position reference updating DP with constant position. Requires a situation where only one reference or two of the same type are selected (eg DGNSS).	(Vessel likely to drift-off due to frozen reference.) Detect fault. Enable stable references, if available, and deselect faulty references.		
26	GNSS signals/ DGNSS correction signals blocked because of close proximity to platform.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference, if required/available. Consider loss during operation planning. Should have been picked up during planning, change to a different correction source.		
27	DGNSS correction signals blocked/ become noisy due to atmospheric/ scintillations interference.	Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/available.		
28	Signal lost due to an object (such as a crane or other vessel) passing between Artemis (fixed/mobile antennas), Fanbeam/Cyscan (sensor/reflector) or RADius /Radascan (interrogator/ transponder).	Determine cause (line of sight blocked). Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
29	Fail RADius/Radascan due to battery failure in transponder.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
30	Fanbean/Cyscan/Spottrack signal fails due to rain showers, snow or fog.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		

31	Drift Fanbeam/Cyscan, due to system switching targets and acquiring reflectors on the coveralls of a moving worker (on a platform).	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
32	Fail HPR transponders due to excessive noise.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
33	HPR interference due to another vessel in the area using the same transponder.	Check with other vessels in area before deploying transponders.		
34	Fail HPR transponders due to battery failure or due to HPR system failure.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
35	Making position moves while working in shallow water using Taut Wire and/or HPR as references.	Take shallow water into account and expect large number of replumbs and possibly noisy HPR. If possible, deploy surface references as backups.		
36	Taut Wire fouled, for example by ROV, diver, downlines or air lines.	Monitor divers/ROV closely. Make all parties aware of Taut Wire/HPR locations. Deploy standby reference or fix problem with fouled reference.		
37	Taut Wire failure due to mechanical problems.	Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/available. If no standby reference, consider effect on vessel operational status.		
38	Conducting operation using the minimum number of references required as per standing orders or field procedures. Fail one of the references.	Have standby reference available for activation/ deployment. If no standby reference, consider effect on vessel operational status. Update DP Status, as required.		

39	Fail references (dependent on number and type selected) to cause position dropout/ model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location if required. Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		
40	Increase noise on a reference to the point where it is still accepted by DP but weight is alternating between very low and/or 0.	Detect fault. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. (With no weight the reference is not acceptable.)		
41	Drop-out of GNSS signals resulting in loss of Absolute reference within DARPS system and subsequent loss of "Reaction Box" function. (Shuttle Tanker, Tandem Loading.)	Monitor movement of both FPSO/FSU and shuttle tanker to ensure relative movement does not become out of phase. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		
42	Failure of all relative position reference systems, with only Absolute DGNSS functioning. (Shuttle Tanker, Tandem Loading.)	Use all means to assess change in relative position – such as hawser catenary and/ or tension. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		
43	Drift-one of two online DARPS systems. (Shuttle Tanker, Tandem Loading.)	Detect fault. Determine which of the two DARPS has an error. Check standing orders/field procedures for minimum references. Activate standby reference, if required/available.		
No.	**Failure mode (Power)**	**Corrective action**	**Completed**	**Exercise No.**
44	Vessel equipped with switchboard that can be divided into at least two sections with a bus tie breaker. Half the switchboard (1 section) has a blackout causing the loss of the thrusters it supplies. Vessel working upwind of platform and near capability limits (with one Bus section offline).	This would be a worst-case failure and vessel needs to go to Yellow alert, safely stop operations and then move vessel to a drift-off position and move outside 500m.		

45	Complete blackout due to failure of bus tie breaker to work properly. (When operating with common bus.)	Monitor position while drifting. Prepare for immediate action on return of power supply. Update DP Status, as required. Emphasis on bridge-ER communication/coordination.		
46	Start operation with minimum number of generators. Increase environmental loads. (Power management system fails to react to increased demand.)	Monitor power usage and request start of extra generators as required.		
47	Generator/generators fail during operation.	Consider effect of reduced power capacity on capability of vessel. Bring extra generators online (if available) to replace those lost. Move vessel to safe location if required. Update DP Status, as required.		
48	Generator/generators out of service either due to failure or for maintenance.	Consider effect of reduced power capacity on capability.		
49	Vessel equipped with switchboard that can be divided into at least two sections with a bus tie breaker. At exercise start, should half the switchboard (one section) have a blackout, vessel does not have required redundancy to conduct the operation.	Operation should not commence until required redundancy level can be achieved.		
50	Start exercise with common Bus and all online generators on either Bus 1 or Bus 2. (Blackout on that side will cause complete blackout)	Generators in use should be set so that power is available on both busses.		
51	Start exercise (operation which requires the vessel to meet Class 2 redundancy requirements) with common bus and all generators online.	The bus should be split, with adequate generators online to meet redundancy requirements, before starting operations.		
52	Complete blackout. Then make all thrusters available and give back only one generator or multiple generators that have insufficient power to meet thrust requirements for the current scenario.	Monitor position while drifting. Prepare for immediate action on return of power supply. Decide how best to utilise available power/ thrust so as to minimise loss of heading/position and the possibility of further blackout. Update DP Status, as required.		

No.	Failure mode (Environment)	Corrective action	Completed	Exercise No.
53	Change weather conditions and/or current such that work must be terminated or vessel position/heading changed.	Observe degrading weather closely and take action before vessel loses redundancy or ability to safely conduct operation.		
54	Change current and/or wind 180° causing a blow-off situation to become a blow-on situation. (Possibly use in conjunction with item 55.)	Determine effect on vessel capability. Determine if it is still safe to conduct operation. Update DP Status, as required.		
55	Increase current and/or wind to a point beyond limits for redundancy.	Change vessel heading/ position to reduce current load. Suspend operation if heading/ position change not possible. Update DP Status, as required.		
56	Wind shift from ahead to the beam. (Wind speed such that redundancy limits are exceeded.)	Determine effect on vessel capability. Adjust heading or position if required. Update DP Status, as required.		
57	Sudden wind shifting in both speed and direction due to thunder storm activity. (10 knots on bow to 50 knots on beam in 45 seconds.)	Determine effect on vessel capability. Adjust heading or position if required. Update DP Status, as required.		
No.	**Failure mode (Miscellaneous)**	**Corrective action**	**Completed**	**Exercise No.**
58	Vessel is conducting subsea operations (such as diving, pipe laying or ROV operations) on the lee side of a platform. There is then a serious gas leak at the platform. Also applicable to DP Shuttle Tanker when connected to an FPSO during tandem loading operations.	Consider the effect of the leak on the vessel and the dangers it presents. Take action to immediately suspend operations and prepare to move the vessel to a safe location. Update DP Status, as required.		
59	Unknown external force causes position excursion (eg vessel alongside comes in contact, thruster wash, load on crane becomes fouled, crane lift was not vertical, tension on cargo hose winching line)	Determine cause of excursion and take action to remove force. Consider possibility of excursion during planning. Update DP Status, as required.		

60	Fire (false alarm or actual fire) or flooding. Possibly in a compartment containing DP related equipment.	Determine effect (if any) on vessel capability. Monitor to ensure that vessel remains within operational limits. Suspend DP operations and move to a safe location, if determined to be a real fire. Update DP Status, as required.		
61	Man overboard near running thruster/thrusters.	Shut down thruster/thrusters, if required. Determine effect of the shutdown on vessel capability. Monitor to ensure that vessel remains within operational limits. Possibly suspend DP operations and move to a safe location, depending on the results of shutdown/recovery operation. Update DP Status, as required. Raise MOB Alarm.		

Offshore scheme

Mandatory: It is compulsory for training centres to apply at least one item from each section (Thrusters, Sensors, Position Reference, Power, Environment and Miscellaneous) during the Simulator Course and its exercises. Other failures are subject to the training centre's choice, either to apply them through the exercises or discuss them during the debriefing. In the case of debriefing, a note should be made in the failure mode table to specify that.

Items recommended:
- Item 1, 2, 4, 6 and 7
- Item 21
- Item 27
- Item 44, 45, 47 and 52
- Item 53

Shuttle Tanker: All items below are **mandatory** during Course C of the Shuttle Tanker scheme.
- Item 1, 4, 5
- Item 15 and Item 21
- Item 25, 27, 28, 38, 39, 41 and 42
- Item 46 and 49
- Item 55 and 57
- Item 58

12. Summary of Simulation

Team 1	Team 2	Team 3
Team Members	Team Members	Team Members
Wind:	Wind:	Wind:
Current:	Current:	Current:
Final Approach Heading:	Final Approach Heading:	Final Approach Heading:
500m Checklist Completed:	500m Checklist Completed:	500m Checklist Completed:
Dive Checklist Complete:	Dive Checklist Complete:	Dive Checklist Complete:
Communications Check Completed:	Communications Check Completed:	Communications Check Completed:
DP Events Induced by Instructor	DP Events Induced by Instructor	DP Events Induced by Instructor

13. Recording Student Performance

Student Performance – DP advanced competence checklist NI Competence		Participant name: Date: Course:		
1. Operation of a DP System		**Tax code**	**Checked**	**Comment:**
1.1	Demonstrate an ability to set up and operate the DP system under the various control modes, and to carry out manual, mixed manual/automatic manoeuvres.	A		
1.2	Demonstrate the operation of position reference systems, sensors and peripheral equipment associated with the DP system.	A		
2. DP Operation				
2.1	Interpret vessel plans and specifications, capability diagrams and other data relevant to the planning and conduct of DP operations.	A		
2.2	Using vessel and other data assess the capability of the vessel to complete successfully and proposed operation.	A		
2.3	Carry out risk assessment exercise on proposed operations and determine the level of redundancy appropriate.	A		
2.4	Make appropriate contingency plans to cover any foreseeable system failure or operational requirement. Contingency planning to include appropriate escape routes for the vessel.	A		
2.5	Demonstrate compliance with appropriate procedures to be followed when approaching any work site and transferring from conventional vessel control to DP control.	A	N/A	
2.6	Demonstrate effective completion of Pre DP and other checklists.	A		
2.7	Demonstrate effective communication needed during DP operations and the testing procedures.	A		
2.8	Conduct vessel positioning manoeuvres and station keeping functions following operational plan and procedures.	A		
2.9	Organise DP watchkeeping procedures observing recognised safe working practices.	I	N/A	
2.10	Conduct appropriate watch handover procedures, completing appropriate checklists.	A	N/A	
2.11	Maintain the appropriate logbooks and records pertaining to DP operations.	A		
2.12	Evaluate the various information, warning and alarm messages communicated to the operator.	I		
2.13	Relate the content of the messages in 2.12 above to the actions necessary in relation to the DP operation.	I		

3. Emergency Procedures					
3.1	Recognise the conditions that will cause degraded operational status or emergency status.	K			
3.2	Recognise the warnings and alarms associated with catastrophic failure.	K			
3.3	Evaluate the various factors to be taken into account subsequent to any system failure and determine appropriate actions.	I			
3.4	Carry out procedures to stabilise the vessel position and heading subsequent to a variety of system failures and take appropriate decisions and actions relating to the continuance or abandonment of the operation.	I			

Levels of Cognition
Level 1: Knowledge (K)
To remember or to reproduce on basis of appropriate, previously learned information.
Level 2: Understanding (U)
To give meaning to new situations and or new material by recollection and using necessary present information. To give evidence of insight in certain activities.
Level 3: Application (A)
To use previously-acquired information in new and concrete situations to solve problems that have single or best answers.
Level 4: Integration (I)
To separate information into its component parts, to examine such information to develop divergent conclusions by identifying motives or causes, making inferences and or finding evidence to support generalisations. To creatively apply prior knowledge and skills to produce a new or original whole. To judge the value of material based on personal values or opinions, resulting in an end-product, with given purpose, without real right or wrong answers.

Instructor Name:
Date:
Sign:

14. Practical Assessment Skills Form (Assessor)

Training Centre Name:	
Student Name	**NI Customer Number**
Assessor Name	**Date**

Objective: This assessment is meant to assess the DP Simulator Course students on the minimum standards of competence, by the Nautical Institute approved instructor/assessor by observation of the demonstrable tasks according to the following table.

Notes:

- The students are able to use scenario and vessel descriptions and the DP set-up checklist provided by the Training Centre, however, the use of personal notes during the assessment is not allowed.
- The instructor's role is to monitor for assessment purposes and shall not assist, coach or lead the student.
- The student must pass every item on the list below to be successful. If the student does not pass this DP Set-up Practical Assessment, they must repeat the DP Simulator Course.

Knowledge, Understanding and Proficiency	Pass (P)/ Fail (F)	Observations by Assessor
Competency	**Take control on the DP operator station**	
1. Change the vessel manoeuvre switch from manual control to DP control (if available)		
2. Take command on the DP operator station		
3. Enable all propellers, thrusters and rudders available		
4. Check available power		
Competence	**Check/enable the sensors**	
1. Check/enable the gyro/ compasses in accordance with the vessel's DP classification		
2. Check/enable the wind sensors in accordance with the vessel's DP classification		
3. Check/enable the motion sensors in accordance with the vessel's DP classification		

Competence	Enable position reference system(s)	
1. Select/enable at least one reference system		
2. Verify it is acquired by the system		
Competence	**Change to DP joystick manual control mode**	
1. Select DP joystick manual control		
2. Stabilise position and heading. Select DP joystick auto heading mode		
Competence	**Change from DP joystick manual control to DP auto position control mode**	
1. Control the vessel using auto heading/yaw		
2. Control the vessel using auto sway/athwart mode		
3. Control the vessel using auto surge/ Fore-aft control mode		
4. Control the vessel in 3 Axis (DP Auto position mode)		
Competence	**Select and verify DP settings using a provided DP set-up checklist**	
This checklist shall include but not be limited to: 1. Selects an appropriate unit 2. Selects an appropriate coordinate system 3. Selects an appropriate gain setting 4. Set up warnings and alarms 5. Check if the power system configuration is in accordance with the vessel's DP classification 6. Check thrusters settings		
		Student signature:
		Assesor signature:

The Nautical Institute

Annex C

Sea Time Reduction Course

February 2025 – Version 1

Disclaimer

While every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. Likewise, The Nautical Institute cannot be held responsible for any damage to property or personnel while following these guidelines. This information is produced in good faith, but The Nautical Institute cannot guarantee the accuracy and/or completeness of the information, which is produced for guidance purposes only.

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Document version control

NI Sea Time Reduction Course		
Title	**Version**	**Date**
NI Sea Time Reduction Course	1	20/02/2025

Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)

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1. Introduction

The number of supervised DP sea time days after the Simulator Course may be reduced by a maximum of 30 days by the satisfactory completion of an Intensive DP Simulator Course.

This course can be done straight after the Simulator Course, but trainee DPOs are required to do a minimum of 30 DP sea time days onboard a classed DP vessel and have the Statement of Suitability signed by Master after the course. A company confirmation letter is required for verification of that DP sea time.

As with the other components of the scheme, all DP time or courses leading to reduction of DP time must have been completed within the previous five years.

The Sea Time Reduction training cannot be used for upgrading a certificate from Limited to Unlimited.

2. Minimum Entry Qualification Requirements

The course is an optional element of the DPO training programme and as such successful completion of the DP Simulator Course is required before attendance. A candidate must hold a certificate of competency.

3. Number of Hours

A minimum of 37.5 hours of instruction time is required for this course.

4. Ratio of Students/Instructors/Equipment

The number of students attending a STR Course must be regulated such that each student obtains the maximum amount of 'hands-on' experience of operating the system to ensure the validity of awarding six DP sea time days for each day spent in the simulator. In order to achieve this, The NI allows a maximum of three students per class being taught by one instructor in a Class A Simulator.

5. Delivery Method

The training will be predominantly practical/operational in nature.

In addition to the opportunities that arise during the exercise briefing and debriefing sessions, provisions will be made during classroom tuition to facilitate student feedback of training needs.

Exercise scenarios and case studies will be carried out on a facility that effectively replicates the working environment the trainee will meet onboard. Simulator equipment for the DP Sea Time Reduction training should incorporate facilities that:

- Create a real time operating environment that includes navigation control, manoeuvring and communications instruments replicating that found on a typical dynamically controlled vessel, that will allow trainees to carry out DP watchkeeping and station keeping tasks.
- Provide a realistic visual scenario for day and night, including variable visibility, with a minimum horizontal and vertical field of view in viewing sectors appropriate to the DP watchkeeping and station keeping tasks.
- Realistically simulate own ship dynamics in open water conditions, including the effects of weather, tidal stream, shallow water and interaction with other vessels.
- Realistically simulate faults in the dynamic positioning control system, power generation and distribution systems, propulsion systems, position reference equipment, other sensor equipment and the machine/human interface.

6. Course Aims

The Sea Time Reduction Course should be an opportunity for the trainee to spend extended and intense periods of time on DP station keeping and must challenge the trainee to enhance, consolidate and demonstrate their:

6.1 Knowledge of the DP system and additional equipment and instruments.

6.2 Situational awareness.

6.3 Communication and teamwork skills.

6.4 Ability to analyse trends and pre-empt problems before they arise.

6.5 Ability to evaluate and respond to alarms, faults and emergencies with calm, reason and confidence.

6.6 Ability to complete such administrative and safety-related procedures as completing checklists, filling in logs and performing thorough watch handovers.

The range of exercises that a centre develops to achieve these aims should be appropriate to the intended target group. The following are examples of the typical operational areas that should be considered:

6.7 Saturation and air dive support.

6.8 Sub-sea construction and heavy lift.

6.9 ROV operations.

6.10 OSV operations.

6.11 Cable and pipe laying operations.

6.12 Drilling operations.

6.13 Offshore loading operations.

6.14 Shuttle tanker.

7. Course Objectives

Operation of a DP System

7.1 Demonstrate the ability to set up and operate the DP system under the various control modes and to carry out manual, mixed manual and automatic and fully automatic manoeuvres.

7.2 Demonstrate within the DP Simulator the operation of position reference systems, sensors and peripheral equipment associated with the DP system.

DP Operation

7.3 Interpret vessel plans and specifications, capability diagrams and other data relevant to the planning and conduct of DP operations.

7.4 Using vessel and other data, assess the capability of the vessel to successfully complete any proposed operation. One exercise should be in the form of a table-top analysis. An FMEA should be used along with other appropriate documentation to evaluate a vessel's capability to carry out a given operation.

7.5 Carry out a risk assessment exercise on proposed operations and determine the level of redundancy appropriate.

7.6 Make appropriate contingency plans to cover any foreseeable system failure or operational requirement. Contingency planning to include appropriate escape routes for the vessel.

7.7 Demonstrate compliance with appropriate procedures to be followed when approaching any work site and transferring from conventional vessel control to DP control.

7.8 Demonstrate effective completion of pre-DP and other checklists.

7.9 Demonstrate the effective communications necessary during DP operations and testing procedures.

7.10 Conduct vessel positioning manoeuvres and station keeping functions following operational plan and procedures.

7.11 Organise DP watchkeeping procedures observing recognised safe working practices.

7.12 Conduct appropriate watch handover procedures, completing appropriate checklists.

7.13 Maintain the appropriate logbooks and records pertaining to DP operations.

7.14 Evaluate the various information, warning and alarm messages communicated to the operator.

Emergency Procedures

7.15 Recognise the conditions that will cause degraded operational status or emergency status.

7.16 Recognise the warnings and alarms associated with worst case failure.

7.17 Evaluate the various factors to be taken into account subsequent to any system failure and determine appropriate actions.

7.18 Carry out procedures to stabilise the vessel position and heading subsequent to a variety of system failures and take appropriate decisions and actions relating to the continuance or abandonment of the operation. This to include the following:

7.18.1 Thruster fail to max pitch.

7.18.2 Setpoint/feedback offset.

7.18.3 Loss of all position reference system, entering move into DP system when in DP mode.

7.18.4 Worst case failure and action to be taken.

7.18.5 Movement of position reference systems.

8. Course Assessment

Training centres are required to develop effective assessment procedures to ensure that only suitable applicants are deemed to have successfully completed the course.

9. Online Assessment

Not Applicable.

10. Practical Assessment

To be arranged by the centre.

11. Failure Mode Checklist

The Nautical Institute DP STR Course		Course dates: From: To: Instructor:		
No.	**Failure Mode (Thrusters)**	**Corrective Action** **Note:** Corrective actions, indicated below, should be applied with due consideration to the circumstances of each case.	**Completed**	**Exercise No.**
1	Most useful thruster, or any thruster, fails to 100% pitch/ rpm. (Feedback indicates 100%) Alternatively fail to 100% but have feedback indicate differently (i.e. - 50% or other). Possible (depending on vessel model in use): a. Fail main engine full ahead. b. Fail main engine full astern. c. Fail tunnel thruster to full. d. Fail azimuth thruster to full. e. Fail azimuth thruster to full, with feedback indicating direction 180° opposite to actual. f. Fail thruster to full, with feedback frozen at value seen before failure.	Detect fault. Emergency stop Thruster. (Deselection of thruster does not stop thrust.) Consider vessel capability after failure/loss of thruster and take action, as required. Update DP Status, as required.		
2	Most useful thruster, or any thruster, feedback indicates 100% pitch/rpm but thruster is working normally. Could also set faulty feedback value to less than 100%.	Detect fault. Is heading or position changing? Emergency stop thruster, if required. (Deselection of thruster does not stop thrust.) If thruster is not stopped (DP continues to operate thruster) stop operation, move to safe location and check thruster. Consider vessel capability after fault and take action, as required. Update DP Status, as required.		

3	Most useful thruster (or any thruster) fails to a value between 1% & 99% pitch/ rpm. (Feedback indicates failed value). Alternatively fail to value but have feedback indicates different than failed value.	Detect fault. Is heading or position changing? Emergency Stop thruster, if required. (Deselection of thruster does not stop thrust.) If thruster is not stopped (DP continues to operate thruster) stop operation, move to safe location and check thruster. Consider vessel capability after fault and take action as required. Update DP Status, as required.		
4	Most useful thruster (or any thruster) fails to 0% pitch/rpm	Consider vessel capability after loss of thruster. Take action as required. Update DP Status, as required.		
5	Operator deselects thruster for engineering purposes (request from E/R) engineer trips another (critical) thruster.	Detect mistake. Inform engine room. Determine effect of the loss of this thruster has on vessel capability. Update DP Status, as required.		
6	Thruster having setpoint or feedback error. The magnitude of the error can be set to either cause a thruster alarm or be set so that the error is below alarm limits and only detectable by DPO observation of setpoint/ feedback data. (Possibly azimuth 180° off setpoint.)	Detect fault. Consider vessel capability. Have thruster checked and take corrective action as required. (Non-alarm event might not be noticed by DPOs) The DPO must monitor the thruster setpoint/feedback and understand the information.		
7	Freeze a thruster (setpoint) after the vessel has settled on position and heading. (If a good model has built up there may be no alarm until weather conditions change or a move is input.)	Detect fault. (There may be no alarm if weather conditions are constant and the current model is built up.)		
8	Present a situation where a thruster/thrusters is down for maintenance. Vessel has sufficient remaining thrusters to hold position and complete the task assigned. However, when ½ partial blackout occurs, there will be insufficient thrusters online to maintain position control. (Vessel does not have redundancy with thruster/ thrusters down.)	Project should not progress until adequate thrusters are available.		

9	Any of the thrusters down for maintenance. No effect on redundancy.	Consider effect of thruster loss on vessel capability.		
10	Downline, umbilical, cargo hose, etc.., fouls a thruster causing it to fail.	Consider vessel capability after loss of thruster. Update DP Status, as required. Emergency Stop of the Thrusters to limit any further damage.		
11	ROV power failure while underneath vessel. ROV has sufficient tether out to reach surface and has positive buoyancy. Vessel may be secured/connected to bottom by a pipe, cable or umbilical.	Shutdown thrusters or move vessel (as required) to prevent ROV contacting thrusters. Give consideration to DP operation and redundancy while doing so. (Was umbilical length considered during planning of operation? Does ROV have positive or negative buoyancy?) Update DP Status, as required.		
12	Thrusters in fixed azimuth mode, in light weather conditions. Increase environmental loads to the point where vessel will not maintain position in fixed mode. **Note:** Not possible if the simulated vessel doesn't have a fixed azimuth mode.	Thrusters should be switched to free slew as required to prevent loss of position.		
No.	**Failure Mode (Sensors)**	**Corrective Action**	**Completed**	**Exercise No.**
13	Wind sensor shielded by platform and then sees an increase in wind (15 knots) after vessel move. (Wind increase can vary.)	Position vessel at a distance from platform such that excursion caused by an increase in wind will not cause a collision. (Be aware that the wind sensor is not registering actual wind.)		
14	Wind sensor sees at extra wind (50 knots) for a short period due to helicopter arrival.	Deselect wind sensor before helicopter arrival. Reselect after departure. **Note** some DP systems will just reject the wind from the system, this is a problem if the wind is from a storm front.		
15	False high wind reading registering in DP system (wind sensor sending higher speed to DP than actual wind). Possibly input false reading of 88 knots or other.	Ascertain real order of magnitude of wind, deselect wind sensors, and monitor any vessel movement and correction.		

16	Anemometer fouled (possibly by halyard). Gives fixed wind direction and speed error.	Determine cause of fault. Initiate action to have fault corrected.		
17	Single anemometer failure.	Initiate repairs. Check remaining anemometer/ anemometers, for quality of data, to determine if operation can continue.		
18	Selected gyro drifting slowly; three gyros online.	Investigate gyro error. (If all three gyros are selected, voting should eliminate faulty gyro.) Update DP Status, as required.		
19	Selected gyro drifting slowly; two gyros online.	Investigate gyro error. Attempt to determine which gyro is in error. (If difference becomes too large and faulty gyro cannot be determined, consideration must be given to stopping DP operations.) Update DP Status, as required		
20	Single gyro failure	Consider effect on redundancy. Initiate repairs. Check remaining gyro/gyros. Update DP Status, as required.		
21	Fail gyros (dependent on number selected) to cause position dropout/ model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location, if required. Update DP Status, as required.		
22	Motion sensor selected jumps 5^{o} static angle. (Jump magnitude can vary.)	Investigate alarm. Determine effect, if any, sensor fault has on position references. Update DP Status, as required.		
23	Single motion sensor failure.	Consider effect on redundancy. Initiate repairs. Check remaining sensors. Update DP Status, as required.		
24	Incorrect draught input. Either incorrect manual draught input or draught sensor error.	Detect error and take appropriate action to ensure correct input.		
No.	**Failure Mode (Position references)**	**Corrective Action**	**Completed**	**Exercise No.**
25	A perfect (frozen) position reference updating DP with constant position. Requires a situation where only one reference or two of the same type are selected (eg DGNSS).	(Vessel likely to drift-off due to frozen reference.) Detect fault. Enable stable references, if available, and deselect faulty references.		

26	GNSS signals/ DGNSS correction signals blocked because of close proximity to platform.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference, if required/available. Consider loss during operation planning. Should have been picked up during planning, change to a different correction source.		
27	DGNSS correction signals blocked/ become noisy due to atmospheric/ scintillations interference.	Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/available.		
28	Signal lost due to an object (such as a crane or other vessel) passing between Artemis (fixed/mobile antennas), Fanbeam/Cyscan (sensor/reflector) or RADius /Radascan (interrogator/ transponder).	Determine cause (line of sight blocked). Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
29	Fail RADius/Radascan due to battery failure in transponder.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
30	Fanbean/Cyscan/Spottrack signal fails due to rain showers, snow or fog.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		
31	Drift Fanbeam/Cyscan, due to system switching targets and acquiring reflectors on the coveralls of a moving worker (on a platform).	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/ available. Consider loss during operation planning.		

32	Fail HPR transponders due to excessive noise.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/available. Consider loss during operation planning.		
33	HPR interference due to another vessel in the area using the same transponder.	Check with other vessels in area before deploying transponders.		
34	Fail HPR transponders due to battery failure or due to HPR system failure.	Determine cause. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/available. Consider loss during operation planning.		
35	Making position moves while working in shallow water using Taut Wire and/or HPR as references.	Take shallow water into account and expect large number of replumbs and possibly noisy HPR. If possible, deploy surface references as backups.		
36	Taut Wire fouled, for example by ROV, diver, downlines or air lines.	Monitor divers/ROV closely. Make all parties aware of Taut Wire/HPR locations. Deploy standby reference or fix problem with fouled reference.		
37	Taut Wire failure due to mechanical problems.	Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/available. If no standby reference, consider effect on vessel operational status.		
38	Conducting operation using the minimum number of references required as per standing orders or field procedures. Fail one of the references.	Have standby reference available for activation/deployment. If no standby reference, consider effect on vessel operational status. Update DP Status, as required.		
39	Fail references (dependent on number and type selected) to cause position dropout/model control.	DP Operation to be suspended until problem is corrected. Vessel move to a safe location if required. Check standing orders/field procedures for minimum references. Activate standby reference if required/available.		

40	Increase noise on a reference to the point where it is still accepted by DP but weight is alternating between very low and/or 0.	Detect fault. Check standing orders/field procedures for minimum references. Update DP Status, as required. Activate standby reference if required/available. (With no weight the reference is not acceptable.)		
41	Drop-out of GNSS signals resulting in loss of Absolute reference within DARPS system and subsequent loss of "Reaction Box" function. (Shuttle Tanker, Tandem Loading.)	Monitor movement of both FPSO/FSU and shuttle tanker to ensure relative movement does not become out of phase. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		
42	Failure of all relative position reference systems, with only Absolute DGNSS functioning. (Shuttle Tanker, Tandem Loading.)	Use all means to assess change in relative position – such as hawser catenary and/or tension. Stop cargo transfer operations. Prepare to abort operation or consider taut hawser mode if FSOG permit.		
43	Drift-one of two online DARPS systems. (Shuttle Tanker, Tandem Loading.)	Detect fault. Determine which of the two DARPS has an error. Check standing orders/field procedures for minimum references. Activate standby reference, if required/available.		

No.	Failure mode (Power)	Corrective Action	Completed	Exercise No.
44	Vessel equipped with switchboard that can be divided into at least two sections with a bus tie breaker. Half the switchboard (1 section) has a blackout causing the loss of the thrusters it supplies. Vessel working upwind of platform and near capability limits (with one Bus section offline).	This would be a worst-case failure and vessel needs to go to Yellow alert, safely stop operations and then move vessel to a drift-off position and move outside 500m.		
45	Complete blackout due to failure of bus tie breaker to work properly. (When operating with common bus.)	Monitor position while drifting. Prepare for immediate action on return of power supply. Update DP Status, as required. Emphasis on bridge-ER communication/coordination.		
46	Start operation with minimum number of generators. Increase environmental loads. (Power management system fails to react to increased demand.)	Monitor power usage and request start of extra generators as required.		

47	Generator/generators fail during operation.	Consider effect of reduced power capacity on capability of vessel. Bring extra generators online (if available) to replace those lost. Move vessel to safe location if required. Update DP Status, as required.		
48	Generator/generators out of service either due to failure or for maintenance.	Consider effect of reduced power capacity on capability.		
49	Vessel equipped with switchboard that can be divided into at least two sections with a bus tie breaker. At exercise start, should half the switchboard (one section) have a blackout, vessel does not have required redundancy to conduct the operation.	Operation should not commence until required redundancy level can be achieved.		
50	Start exercise with common Bus and all online generators on either Bus 1 or Bus 2. (Blackout on that side will cause complete blackout)	Generators in use should be set so that power is available on both busses.		
51	Start exercise (operation which requires the vessel to meet Class 2 redundancy requirements) with common bus and all generators online.	The bus should be split, with adequate generators online to meet redundancy requirements, before starting operations.		
52	Complete blackout. Then make all thrusters available and give back only one generator or multiple generators that have insufficient power to meet thrust requirements for the current scenario.	Monitor position while drifting. Prepare for immediate action on return of power supply. Decide how best to utilise available power/ thrust so as to minimise loss of heading/position and the possibility of further blackout. Update DP Status, as required.		
No.	**Failure mode (Environment)**	**Corrective Action**	**Completed**	**Exercise No.**
53	Change weather conditions and/or current such that work must be terminated or vessel position/heading changed.	Observe degrading weather closely and take action before vessel loses redundancy or ability to safely conduct operation.		
54	Change current and/or wind 180° causing a blow-off situation to become a blow-on situation. (Possibly use in conjunction with item 55.)	Determine effect on vessel capability. Determine if it is still safe to conduct operation. Update DP Status, as required.		

55	Increase current and/or wind to a point beyond limits for redundancy.	Change vessel heading/ position to reduce current load. Suspend operation if heading/ position change not possible. Update DP Status, as required.		
56	Wind shift from ahead to the beam. (Wind speed such that redundancy limits are exceeded.)	Determine effect on vessel capability. Adjust heading or position if required. Update DP Status, as required.		
57	Sudden wind shifting in both speed and direction due to thunder storm activity. (10 knots on bow to 50 knots on beam in 45 seconds.)	Determine effect on vessel capability. Adjust heading or position if required. Update DP Status, as required.		
No.	**Failure mode (Miscellaneous)**	**Corrective Action**	**Completed**	**Exercise No.**
58	Vessel is conducting subsea operations (such as diving, pipe laying, or ROV operations) on the lee side of a platform. There is then a serious gas leak at the platform. Also applicable to DP Shuttle Tanker when connected to an FPSO during tandem loading operations.	Consider the effect of the leak on the vessel and the dangers it presents. Take action to immediately suspend operations and prepare to move the vessel to a safe location. Update DP Status, as required.		
59	Unknown external force causes position excursion (eg, vessel alongside comes in contact, thruster wash, load on crane becomes fouled, crane lift was not vertical, tension on cargo hose winching line.)	Determine cause of excursion and take action to remove force. Consider possibility of excursion during planning. Update DP Status, as required.		
60	Fire (false alarm or actual fire) or flooding. Possibly in a compartment containing DP related equipment.	Determine effect (if any) on vessel capability. Monitor to ensure that vessel remains within operational limits. Suspend DP operations and move to a safe location, if determined to be a real fire. Update DP Status, as required.		
61	Man overboard near running thruster/thrusters.	Shut down thruster/thrusters, if required. Determine effect of the shutdown on vessel capability. Monitor to ensure that vessel remains within operational limits. Possibly suspend DP operations and move to a safe location, depending on the results of shutdown/recovery operation. Update DP Status, as required. Raise MOB Alarm.		

Offshore scheme

Mandatory: It is compulsory for training centres to apply at least one item from each section (Thrusters, Sensors, Position Reference, Power, Environment and Miscellaneous) during the Simulator Course and its exercises. Other failures are subject to the training centre's choice, either to apply them through the exercises or discuss them during the debriefing. In the case of debriefing, a note should be made in the failure mode table to specify that.

Items recommended:

- Item 1, 2, 4, 6 and 7
- Item 21
- Item 27
- Item 44, 45, 47 and 52
- Item 53

Shuttle tanker: All items below are **mandatory** during Course C of the Shuttle Tanker scheme.

- Item 1, 4, 5
- Item 15 and Item 21
- Item 25, 27, 28, 38, 39, 41 and 42
- Item 46 and 49
- Item 55 and 57
- Item 58

The Nautical Institute

Annex D

Shuttle Tanker Course A

February 2025 – Version 1

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Document version control

NI Shuttle Tanker Course A		
Title	**Version**	**Date**
NI Shuttle Tanker Course A	1	20/02/2025

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1. Introduction

Course A is an NI Recognition Course (not an Accredited Course) and refers to the completion of appropriate Position Reference System (PRS) course offered by Recognised Position Reference System manufacturers or their approved agents. This course may be offered by accredited DP Training Centres having facilities to conduct the course with the approval of system manufacturers.

Evidence of course completion must be provided by appropriate documentary evidence issued by the organisation conducting the course. Based on the evidence, Training centres should complete, sign and stamp the appropriate entry in the Shuttle Tanker Logbook.

The Course A PRS training requirement may also be satisfied by a participant undertaking training at a centre approved by the NI for PRS training. Such training must be conducted over a period of 4-5 days and cover instruction in a minimum of 3 different PRS arrangements.

At the end of the course, the trainee should obtain a certificate of attendance. The NI Recognition Logo may be used. The NI recognises these courses but does not accredit them.

2. Minimum Entry Qualification Requirements

There are no minimum entry requirements but completion of a DP Induction Course or a suitable "DP Awareness" course is recommended.

3. Number of Hours

The duration of each individual PRS course should be as per the manufacturer's recommendations.

The entire course duration is to be planned by the training number of PRS centre depending on their course content, number of PRS they wish to teach and the time they wish to allocate for each PRS as per the manufacturer's recommendation.

It is however recommended that the full course should be run for a minimum of four days (six hours per day) to adequately cover all the aspects and requirements of the training.

4. Ratio of Students/Instructors/Equipment

The NI allows a maximum of 10 students per class being taught by one instructor. Simulators used for this training could be the actual equipment or be PC-based.

5. Delivery Method

The duration of each course should be as per the individual PRS manufacturer's recommendations. Courses should be aligned with existing practices in regards to course duration. The contents of the course should be appropriate to the complexity and risk of each type of PRS.

Vessel owners are required to ensure onboard familiarisation of current software version with structured familiarisation program. Theory may be used to support the practical exercises either as a briefing, a de- briefing or for demonstration purposes.

The following PRS Systems are mandatory:

- Artemis operator course.
- (HPR/HiPAP (or other HPR PRS) operator course.
- DGNSS/DARPS (or other relative GPS PRS) operator course.

The following are optional:

- Parker PMS System operator course.
- RadaScan , RADius (or other FMCW PRS) operator course.
- Cyscan, Fanbeam (or other laser-based PRS) operator course.

It is understood that the list above is not exhaustive and refers to the major systems currently in use. Other systems may be included if so desired or if newer systems are introduced.

Each position reference course should cover as a minimum the following:

- Principle of operation.
- Advantages and disadvantages (limitations).
- Failure Modes.
- Quick Reference Guides.
- Interaction with other PRS.

6. Course Aims

On completion of the course, the student should be able to:

6.1 Understand the practical operations of the various Position Referencing Systems.

6.2 Recognise the various alarms, warnings and information messages.

6.3 Be able to assess the strength, capability and dependability of the PRS System.

6.4 Be able to assess the weaknesses and limitations of the PRS System.

6.5 Recognise conditions that will cause degraded operational status of the PRS.

6.6 Take remedial action in the event of system failure due to loss of PRS.

6.7 Take emergency action, which may involve suspension of operations.

7. Course Objectives

The following is a list of the objectives which should be attained by the candidates upon completion of Course A. The trainee should be able to:

7.1 Describe the following position reference systems commonly associated with DP installations: Differential GNSS, hydro acoustic, Artemis, FMCW Radar and laser-based systems. (Taut wire and PRS interfaced with INS may also be described in basic terms)

7.2 Describe the failure modes of the following position reference systems: Differential GNSS, hydro acoustic, Artemis, FMCW Radar and laser-based systems. (Also Taut Wire and INS briefly)

7.3 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.

7.4 Understand the importance of ASOG, TAM and CAM.

7.5 Describe the failure modes of the following sensors: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.

7.6 Recognise the advantages as well as the limitations of the various systems.

7.7 Recognise that multiple PRS systems may be in use in Shuttle Tanker Operations, their balance and weighting, safe operating limits and how these may be degraded by failure of a single PRS.

8. Course Assessment

Appropriate assessment will depend on the PRS being taught and will be made by the training centre.

9. Online Assessment

There are no on-line assessments for this course.

The Nautical Institute

Annex E

Shuttle Tanker Course B

February 2025 – Version 1

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NI Shuttle Tanker Course B		
Title	**Version**	**Date**
NI Shuttle Tanker Course B	1	20/02/2025

Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)

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1. Introduction

The shuttle tanker operation simulator training course relates to the offshore loading Phase 2 type course. To concentrate on shuttle tanker specific behaviours and include a range of offshore loading installation types.

2. Minimum Entry Qualification Requirements

3. Number of Hours

Five days (six hours per day), totaling 30 hours.

4. Ratio of Students/Instructors/Equipment

Three students maximum on a Class A Simulator only.

5. Delivery Method

As per training centre.

6. Course Aims

The focus of the exercises should be on the practical handling of shuttle tankers in the vicinity of offshore installations. This should include approach to the operational zones, safe interaction with the offshore terminal facilities, including the effects of mooring systems, hose connections, emergency shutdowns, interaction with tanker assist vessels and field communications. All functions of propulsion, power generation and position reference systems should be included in the discussions and exercises, as well as effects and instances of equipment and system errors/failures. Students will also acquire knowledge of offtake tanker operational procedures.

A separate basic shiphandling course should have been completed prior to attending this course, as the revision section is limited to a refresher on basic shiphandling techniques.

Such a shiphandling course should cover:

6.1 Effects of deadweight, draught, trim, speed and under-keel clearance on turning circles and stopping distances.

6.2 Effects of wind and current on shiphandling; application of rate of turn (ROT) techniques.

6.3 Manoeuvring in shallow waters, including under-keel clearance caused by squat, rolling and pitching.

6.4 Interaction between ships and between own ship and nearby banks (bank effect).

6.5 Berthing and unberthing under various wind, tide and sea-current conditions with and without tugs.

6.6. Ship and tug interaction, various types of tugs.

6.7 Use of propulsion and manoeuvring systems.

6.8 Where possible, use of tunnel and azimuth thrusters.

A suitable course format is currently available as Offshore Loading Phase 1 at some training establishments.

7. Course Objectives

The reasons for the majority of incidents related to vessel handling operations can be traced to human error or lack of professional problem mitigation. The main objective of the courses is for Masters and DPOs to achieve optimal understanding and skills in DP mode, DP manual mode and in traditional manual modes, where appropriate. This will further improve the safety of the tanker's manoeuvring and loading operations.

Vessel handling exercises should be carried out on simulators. Approaches to an offshore terminal should be carried out primarily by using DP systems, but a manual mode approach should be included for comparison. Simulations should also include reconstruction of known DP incidents involving offtake tankers. The complexity and value of these exercises will be enhanced by appropriate previous experience of the person in charge of the simulator.

Course Content

The following sections outline content of a typical training course designed to provide the competence required to achieve a satisfactory understanding and skill level.

7.1 Shiphandling Refresher Section:

7.1.1 Repetition of rate of turn (ROT) techniques and other theoretical items from basic Shiphandling course noted in Purpose (above).

7.1.2 Practical exercise on simulator to confirm adequate understanding of MCRM principles and practices.

7.1.3 Further practical exercises on simulator if the instructor considers it necessary, based on responses from above two assessments.

7.2 Offshore Loading specific section:

7.2.1 Gain knowledge of requirements and guidelines that apply to offtake tanker DPOs. Achieve increased skills in operating the DP system and the manual manoeuvring of vessels under normal and severe/marginal environmental conditions, with systems intact and with system errors, such as loss of position reference systems, thruster failure and sensor failures.

7.2.2 Gain a good understanding of the DP system's possibilities and limitations.

7.2.3 Gain a good understanding of field operator's offshore loading manuals for various fields.

7.2.4 Gain a good understanding of the correct use of position reference systems for DP.

7.3 General section:

7.3.1 Review any updates in latest industry best practice including new legislation, new recommendations/guidance, new systems, new fields and terminal types.

7.3.2 Revision of DP Systems and Operation, to include Tandem FPSO (active and passive); STL; OLS; and taut hawser options:

i. Interpret vessel specifications, field specifications and other data relevant to planning approach and offloading operations.
ii. Using capability plots and environmental data to assess the capability of the vessel to complete the planned operation safely.
iii. Ensure correct level of redundancy is available and that risks are assessed adequately.
iv. Develop contingency plans and escape criteria/routes.
v. Demonstrate compliance with appropriate procedures for different stages of the operation.
vi. Demonstrate use of the Approach Mode, controlling the vessel speed and movement.
vii. Demonstrate use of DP modes that monitor and control heading differences between FPSO/FSU and shuttle tanker, during tandem loading operations.
viii. Demonstrate use of DP modes that monitor and control the relative position of the shuttle tanker, in relation to the FPSO/FSU, during tandem loading operations.

7.3.3 Relative and Absolute Position reference systems such as DARPS, Artemis, Radius, Radascan, Fanbeam, and HiPap:

i. Demonstrate correct set-up and use of such systems.
ii. Demonstrate awareness of errors and failures – how they occur, develop and need to be handled.

7.3.4 Discuss and learn from recent and important past incidents from industry sources. Simulator exercises should include appropriate Failure Modes selected from The NI checklist, and:

7.4 Manoeuvring according to field procedures and DP best practice.

7.5 Approach and departure with and without tanker assist vessels.

7.6 Shiphandling in changing wind speed and direction.

7.7 Shiphandling in changing current speed and direction.

7.8 Shiphandling with variable wind and current.

7.9 Tandem positioning – free weathervane; operator selected heading; spread moored operation and taut hawser operations.

7.10 Escape manoeuvring.

7.11 Engine, propeller and rudder errors/failure.

7.12 Thruster errors/failure.

7.13 DP errors.

7.14 PRS errors.

7.15 ESD 1 and 2 processes.

8. Course Assessment

A theoretical and practical test should be held at the end of each course and an assessment report handed to the participant.

9. Online Assessment

Not applicable.

10. Practical Assessment

As per training centre.

The Nautical Institute

Annex F

DP Revalidation Course

February 2025 – Version 1

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Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)
116	Introduction		Merging DP Revalidation and DP Refresher and Competency Assessment Courses
116	Minimum Entry Qualification Requirement	The Revalidation Course may be completed up to six months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, in which the DPO must send in an application into The NI.	The Revalidation Course may be completed up to twelve months before the revalidation date set by The NI. The course will be valid for a period of12 months only, in which the DPO must send in an application into The NI.

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1. Introduction

The Nautical Institute (The NI) has introduced an alternative route to revalidation through the implementation of a Revalidation Course. The requirements for the Revalidation Course are established through this document.

The contents of the DP Revalidation and the DP Refresher and Competency Assessment Courses are similar. The NI agreed to merge the course with DP Refresher and Competency Assessment Course. The single course will be known as the **DP Revalidation / DP Refresher and Competency Assessment Course.**

If a training centre is approved for the Revalidation course, it is also approved for the DP Refresher and Competency Assessment course. The training centre should amend the title of the course to:

DP Revalidation / DP Refresher and Competency Assessment Course

Training centres will not need to administer two separate sets of course materials.

Revalidation and refresher course participants can attend the same course. It is the training centre's responsibility to ensure they meet the ratio of students as per the NI Standard and issue the appropriate certificate on completion of the course.

2. Minimum Entry Qualification Requirements

The minimum entry requirement is a DPO Certificate issued by The NI. The original DPO Certificate should be presented at the DP Centre where the Revalidation Course is completed.

The Revalidation Course may be completed up to twelve months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, in which the DPO must send an application to The NI.

If the participant is completing the course for the first time, there is no minimum DP sea time requirement.

If the participant is completing the course for a second or subsequent time, a minimum of 28 DP sea time days will be required to revalidate. This DP time may be completed prior to or after the Revalidation Course.

Where a participant subsequently revalidates after taking the course by completion of the full sea time requirement of 150 DP sea time days that participant can then take the Revalidation Course again without a DP sea time requirement.

Legacy and Grandfathered certificate holders will need to complete DP sea time days towards revalidation.

Please Note: Shuttle Tanker Certificate holders required to revalidate their certificates with the Revalidation Course. For information on how to revalidate a Shuttle Tanker Certificate or convert to the Offshore Scheme please see Section 6.

3. Number of Hours

A minimum of 34 hours of teaching and simulator time is required for this course which includes the time needed for the examination and assessments. The course must schedule both practical and theoretical aspects with about 50% of the time assigned to each. The course is to be delivered over five days.

4. Ratio of Students/Instructors/Equipment

The NI allows a maximum of four students per class being taught by one instructor per one Class B or A Simulator.

By exception and where justified, five or six students may be considered at the discretion of The NI's Accreditation Team, based on the number of simulators in place, rotation of students and the use of the training methodology in place.

When two different types of simulator systems from two different manufacturers are available in a training centre, the best practice is to keep the trainee on the same simulator throughout the course.

A minimum requirement is to use an NI DP Class B Simulator to correspond with the training objectives for the Revalidation Course.

5. Delivery Method

Training will be split equally between theory and practical exercises. Theory may be used to support the practical exercises either as a briefing, a de-briefing or for demonstration purposes.

6. Course Aims

The course is intended for those who have already been issued a DPO Certificate from The NI but are unable to revalidate their DPO Certificate if they have not gained sufficient DP sea time. The overall course aim is to update the DPOs with the latest rules and regulations, position references and sensors, known DP incidents and lessons learned. At the end of the course, the student should:

6.1 Have acquired knowledge of the latest rules and regulations.

6.2 Have acquired knowledge of the latest developments within sensors and PRS.

6.3 Have acquired knowledge of the latest relevant DP incidents and why they occurred.

6.4 Be able to recognise the various alarm, warning and information messages.

6.5 Be able to carry out operational planning, risk assessment and hazard identification tasks.

6.6 Be able to set up the DP system for a particular task/operation.

6.7 Be able to decide on courses of action because of systems failure.

7. Course Objectives

The following is a list of the objectives that should be attained by the DPOs upon completion of the Revalidation Course.

By the completion of the training session or period for DP Rules and Regulations the trainee should be able to:

7.1 List the various providers of documents containing statutory requirements and guidance relating to DP operations, including:

7.1.1 IMO (including IMO MSC/Circ. 645 of 1994 and 1580 of 2017 Guidelines for Vessels with Dynamic Positioning Systems).

7.1.2 Classification society DP rules.

7.1.3 International Marine Contractors Association (IMCA).

7.1.4 Marine Technology Society (MTS).

7.1.5 IMCA and MTS guidelines for ASOG.

7.2 Explain the purpose of documentation associated with DP operations, such as DP operations manuals, Failure Modes and Effects Analysis (FMEA) and capability plots.

7.3 Describe the IMO (DP) equipment classes and their application, with reference to the IMO Guidelines for Vessels with DP Systems.

7.4 Understand the importance of reporting DP incidents knows where to find DP incident reports and knows how to report DP incidents.

By the completion of the training session or period for DP Sensors and PRS the trainee should be able to:

7.5 Describe the following position reference systems commonly associated with DP installations: Differential GNSS, hydro acoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.

7.6 Describe the failure modes of the following position reference systems: Differential GNSS, hydro acoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.

7.7 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor. ASOG, TAM and CAM.

7.8 Describe the failure modes of the following sensors: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.

By the completion of the training session or period for DP Set-Up the trainee should be able to:

7.9 Ensure the vessel is on DP in accordance with the vessel's class and the vessel's operation manual; complete DP checklist for class-approved FMEA and ASOG.

7.10 Determine and set alarm and warning limits.

7.11 Evaluate most appropriate PRS for specific DP-operations.

7.12 Select the number of position reference systems required in accordance with the DP class.

7.13 Use correct thruster allocation for a specific operation and weather conditions.

7.14 Test vessel's manoeuvring capability during prevailing weather conditions.

7.15 Determine a Safe Position and minimum distances to stabilise the vessel in DP.

7.16 Obtain information and clearance from eg installation, on issues important for the safe operation of the vessel under DP.

By the completion of the training session or period for DP Bridge Watchkeeping the trainee should be able to:

7.17 Demonstrate a continuous awareness of the vessel's status, operation and impact of operating under DP.

7.18 Recognise the importance of maintaining lookout and awareness of the external situation including weather when controlling a vessel close to installations or other objects.

7.19 Recognise situations in which to call the Master to the bridge.

7.20 Log and report DP station keeping events.

7.21 Monitor position reference systems, sensors and signal quality in anticipation of the possibility of failure causing instant or violent reactions from main engines or thrusters.

7.22 Monitor power output and thrust.

7.23 Monitor thruster efficiency for station keeping at different headings and draughts, which may affect DP Class.

7.24 Recognise DP-related changes in vessel systems and technical equipment, which may affect DP Class.

7.25 Recognise technical and operational issues that may limit or stop DP operations.

7.26 Monitor that the DP operating parameters of continuous operating power are not exceeded.

By the completion of the training session or period for Position Keeping the trainee should be able to:

7.27 Recognise alarms related to the incorrect operation of the DP-system and maintaining position.

7.28 Acknowledge alarms within time constraints.

7.29 Discuss alarms with relevant departments.

7.30 Evaluate the possible consequences of each alarm and possibility to continue the operation.

7.31 Analyse the consequence analysis alarm.

7.32 Interpret visual indicators, indicating conditions which may result in malfunction of DP.

7.33 Monitor movement of the vessel and changes in the position and heading, in keeping with safe excursion limits deending upon the ongoing task/operations.

7.34 Monitor movement of the object/installation/ target.

7.35 Monitor by various means, changes in distance/heading between object and own vessel (if applicable).

7.36 Recognise limitations of vessel movement when having equipment or divers deployed.

By the completion of the training session or period for Environmental Conditions the trainee should be able to:

7.37 Recognise changes in environmental conditions.

7.38 Recognise when environmental conditions become critical with reference to station keeping.

7.39 Recognise increased importance of situational awareness when operating close to floating objects.

By the completion of the training session or period for Alarms and Indicators the trainee should be able to:

7.40 Identify the procedures to follow for DP and non-DP alarms.

7.41 Identify the procedures for when to change DP Alert status (eg from green to amber/yellow, blue/white or red).

By the completion of the training session or period for Change of DP Watch the trainee should be able to:

7.42 Prepare a hand-over checklist.

7.43 Transfer vessel's status and DP-details when handing over the watch (where not covered by the watchkeeping checklist).

7.44 Provide an update on the ongoing operation and planned operational activities.

7.45 Review a hand-over checklist.

7.46 Verify vessel's position or movement and status.

7.47 Interpret all necessary information of vessel and operation.

7.48 Take-over/hand over DP watch in a formal and clear manner.

7.49 Determine the DP status and recent occurrences that may have an effect on the DP operation during the watch.

By the completion of the training session or period for Normal Completion of a DP Operation the trainee should be able to:

7.50 Identify safe departure route and best vessel heading for departure.

7.51 Recognise external dangers prior to departure.

7.52 Identify an Emergency Escape route, which may or may not be the same as the normal departure route.

7.53 Retrieve Position Reference System Equipment from eg the installation or seabed (if applicable and as part of a Departure checklist).

7.54 Demonstrate moving to a safe position in appropriate steps.

7.55 Recover/retract deployed equipment (if applicable).

By the completion of the training session or period for Operating in Joystick Mode (DP Joystick) the trainee should be able to:

7.56 Stop the vessel at a pre-determined position.

7.57 Determine the need to stop the vessel completely before switching to DP control (system specific).

7.58 Operate the DP joystick to maintain position and/or heading in a controlled and safe manner.

7.59 Operate the DP joystick to change position and/or heading in a controlled and safe manner.

7.60 Demonstrate DP joystick station keeping of the vessel under prevailing weather conditions.

By the completion of the training session or period for Emergency Situation the trainee should be able to:

7.61 Move the vessel to a safe position in a safe and controlled manner.

7.62 Demonstrate an awareness of the Emergency Escape Route.

By the completion of the training session or period for Emergency Performance/Response the student must demonstrate at least two of the following:

7.63 Demonstrate actions in case of unstable Position Reference System(s).

7.64 Demonstrate actions when losing Position Reference System(s).

7.65 Demonstrate actions if Position Reference System(s) suddenly indicate significant changes in position/range/bearing data.

7.66 Demonstrate actions in case of error in wind input.

7.67 Demonstrate actions in case of a DP drive-off.

7.68 Demonstrate actions in case of a DP drift-off.

7.60 Demonstrate actions in case of a DP force-off.

7.70 Demonstrate actions in case of one thruster run-off.

7.71 Demonstrate actions in case of error in sensor input.

7.72 Demonstrate the proper sequence of actions if experiencing an onboard emergency which may influence DP-control during DP operations.

7.73 Explain actions when losing all DP control functions.

7.74 Explain the proper sequence of actions if colliding or about to collide with an installation, nearby objects or vessels during DP-operations.

8. Course Assessment

The assessment for the Revalidation Course includes a theoretical (NI online) exam and a practical assessment. Each component must be completed successfully. There is no specific order in which they must be completed. After the course is completed, an entry will be made in the appropriate logbook.

9. Online Assessment

In order to be awarded a certificate of completion for the Revalidation Course, the DPO must pass an online assessment at the training centre.

The exam is composed of multiple-choice questions that have already been developed from the Induction Course and the Simulator Course. The online assessment will consist of 30 questions and shall be completed in one hour with a pass mark of 70%.

Students who fail the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. If the student fails these three attempts, the student is required to repeat the Revalidation Course and undertake the assessment again.

10. Practical Assessment

The practical assessment must be done individually. The practical assessment shall include the following items which the student must pass to be awarded a certificate of completion for the Revalidation Course:

i. Complete a DP Checklist.
ii. Set up the vessel on DP.
iii. Move the vessel from set-up position to a worksite.
iv. Deal with a system/sensor/thruster failure or environmental change (at least two).

The training centres must develop their own practical exams based upon the course objectives listed above.

The student must pass all the four items listed above. The training centre is responsible for ensuring that the assessment is carried out in a professional manner and that the student is assessed with thoroughness in line with the standards of The NI.

10.1 Practical Assessment Guidance for Training Centres

Below you will find guidance for the development and the examination process for the practical assessment for the Revalidation Course.

10.1.1 General Guidance

i. Duration of practical assessment: Between one and two hours.
ii. Pass or fail criteria: This item will be the most challenging. The student's performance is evaluated by the instructor and in an ideal world; such an evaluation should be objective. Although the student must pass all items, it could be that some items are performed as a "pass" whilst other items could be defined as a "fail". It will be the overall performance of the student that determines if the practical assessment is a pass or fail. For example, failing to identify a small position deviation from one of the PRS inputs would not necessarily mean that the student fails, but failing to identify that the vessel has lost DP Class and that the vessel is now operating without redundancy, would. Depending on the nature of the fail it is up to the DP Training Centre to determine if the student should be allowed to retake the practical assessment. If the fail is related to safety-critical items, as determined by the Training Centre, the student should not be allowed to retake theassessment, but should retake the course. Reason(s) for failing the student should be given to the student in writing.
iii. Students who fail at the first attempt and are allowed to retake the practical assessment, can do this only once. The second attempt must be agreed with the DP Training Centre and carried out at the centre's convenience.

10.1.2 Practical Assessment Scenario Guidance

i. Exam Scenario

After passing the written exam, each student will randomly draw a number linked to the scenario they will be examined on.

Scenarios are to be based on the course training objectives. All scenarios should be equal in complexity.

Each scenario will end with the vessel located at a worksite in close proximity to a platform/structure, such as a fixed platform, a semi-submersible rig or another vessel.

Based on the task to be performed by the vessel at the worksite, there should be at least two possible locations where the vessel can be positioned to complete the task (one drift-on and one drift-off). The student will be expected to choose the better of the two. The following are two examples of scenarios that could be used. The vessel might be required to do an ROV inspection of a platform where there is sufficient tether available to work at both locations. The vessel might be required to position under a crane for cargo operations where there are two cranes available (one upwind and one downwind).

Each centre shall develop its own practical exam scenarios based on the DP equipment fitted and the simulated platforms/structures it has available.

The centre will have 10 to 15 scenarios available for exam purposes. This will permit all students to have a random selection. Multiple scenarios can be created by using the same structure/vessel/task and simply changing the environmental conditions.

Time for planning the practical assessment shall be allocated to the student. 20 minutes before the exam, each student will be presented with their scenario. This will permit the student time to develop a plan as to how they will proceed. One student can carry out the exam while the other is planning; this will save time during the exam process.

Prior to starting the exam, the student will be asked to state the planned vessel position and heading when at the final worksite. The student will also state the direction from which (bearing) they will approach the worksite and the desired heading at exercise start. All students will start at the same distance from the worksite. Before starting the exam, the instructor will place the vessel (exercise start position) on the bearing and heading specified by the student.

ii. Checklist/Set up on DP

The DP checklist below is a sample only. It indicates the extent to which checks are to be conducted and the content required. Each centre will develop its own checklist based on parameters including DP equipment fitted, vessel power plant, thrusters and reference systems fitted. The flow and layout of the checklist would also be as required by the individual centre. The centre may wish to increase the content of the checklist and is free to do so.

There are items that may be omitted. For example, the sample below has two means of determining vessel capability after worse case failure (DP capability plot and deselecting thrusters). Only one means would be required.

The sample below would take approximately 20 to 25 minutes for someone who is familiar with the DP system/vessel. Ability of the individual student will vary. The students are to use the same checklist for the exam as for course exercises. They will also be informed that the checklist is part of the exam.

Some items on the checklist will require the vessel to be set up on DP. Therefore at some point during completion of the checklist, the student will place the vessel in DP mode.

Based on the results of the checklist, the student can request changes to generator, power, switchboard or thruster configurations. The student may also alter the planned approach route and final worksite heading/position, based on the results of the checklist.

iii. Approach to Worksite

After completing the checklist and set up on DP, the student will move the vessel to the worksite. The speeds and methods used by the individual student will vary. If the vessel is outside the 500m zone at the start, this could take considerable time. As a benchmark, a single move of 500m at 0.25m/sec would require 33 minutes. The actual moves during the exam will be undertaken in increments and at varying speeds, making it difficult to indicate an actual time for this item. To reduce time requirements, for exam purposes, the exam may start at a distance of 250 to 300m from the worksite.

iv. At the Worksite

The actual vessel task at the worksite can be as determined by the training centre. This might be diving operations, ROV operations, cargo operations or similar.

The type of practical assessment (eg DP operation) should have been reflected or revised during the Revalidation Course.

The last stage of the exam will introduce a DP fault/failure or environmental change for the student to deal with.

This specification identifies possible faults and indicates that at least two must be utilised. Both can be introduced after the vessel is on location at the worksite but one must be introduced at this stage. The other can be introduced at any stage in the exam, after the vessel is set up on DP. Considering the above, the exact timing of fault injection and the faults to be used, with a particular scenario, will be determined by the training centre.

v. Exam Time Required

If the exam starts at a distance of 250m from the worksite, the total time required for the practical exam should be one to two hours per student. The extent to which the simulated DP operation progresses (after positioning at the worksite) is determined by the training centre.

The first student will require more time as they would require time to plan (20 minutes). Subsequent students would get the same amount of planning time but would be doing so while another is being examined.

10.1.3 Practical Assessment Mark Sheet Example

Each Training Centre must ensure that the training objectives are assessed in a proper manner. It might be difficult to assess each student on all training objectives. Therefore, it would be recommended that a selection of training objectives should be covered during the assessment.

The tables on the following page show the items to be evaluated during the practical assessment. Exercises are to be structured to enable evaluation for the items listed below.

11. Mark Sheet Exam Number 1

Practical Assessment DP Revalidation Course

Name of student:	Exercise name/ number:	Overall Pass/Fail	Instructor sign
	1		

Task no:	Task description: DP Planning	Pass	Fail
1	Carry out operational planning, risk assessment and hazard identification tasks.		
2	Evaluate most appropriate PRS for the DP operation, in accordance with the DP class.		
3	Determine the most appropriate final working position and heading.		
4	Identify emergency escape route.		
Additional Comments:			

Task no:	Task description: DP Set-Up	Pass	Fail
1	Complete DP checklist with accurate recording of data.		
2	Select DP joystick mode. Operate the DP Joystick to maintain position and/or heading in a controlled and safe manner.		
3	Set up the vessel on DP in a controlled and safe manner.		
4	Use correct thruster allocation for the operational and environmental conditions.		
5	Ensure the vessel is on DP in accordance with the vessel's required class; for the operation being conducted (determine capability).		
6	Determine and set appropriate alarm and warning limits for the operation being conducted.		
7	Select appropriate gain setting.		
Additional Comments:			

Task no:	Task description: DP Operations	Pass	Fail
1	Move the vessel to the final working location using appropriate movement steps.		
2	Move the vessel to the final working location at safe speed/speeds.		
3	At the final working location, select appropriate and reliable PRS in accordance with the DP class.		
4	Monitor and recognise any changes in position reference system or sensor performance.		
5	Monitor and recognise any change in power or thrust output.		
6	Monitor and recognise any changes in environmental conditions.		
7	Continue to ensure the vessel is on DP in accordance with the vessel's required class, for the operation being conducted (monitor capability).		
Additional Comments:			

Task no:	Task description: DP Failure Modes	Pass	Fail
1	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode: _______		
2	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode: _______		
3	Evaluate the possible consequences of each alarm and the effect on continuing the operation.		
4	Change DP Alert status (eg from green to amber/yellow, blue/white or red) to reflect operational condition.		
Additional Comments:			

12 Revalidation course timetable

Below is a suggested timetable, which can be used for the Revalidation Course.

DAY – 1		
Time	**Subject**	**Comments**
AM	Registration Introduction – Experience mapping. Familiarisation with centre equipment.	Experience mapping would be a vital part of the Course. The previous experience and knowledge of the participants must be addressed and acknowledged during the course.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 2		
Time	**Subject**	**Comments**
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 3		
Time	**Subject**	**Comments**
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 4		
Time	**Subject**	**Comments**
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 5		
Time	**Subject**	**Comments**
AM	Practical and theoretical examination	Practical examination on a minimum NI Class B Simulator. Theoretical On-Line examination.
Lunch		
PM	Examination continued, if required.	

13. DP checklist

Below is a suggested DP Checklist, which can be used for the Revalidation Course.

DP Checklist

- Date: ______________
- Time: ______________
- Location: ______________
- Position: N ________ E ________
- Water Depth: ______________
- Light/Shapes (On/Up): Y / N
- Read Latest Forecast: Y / N
- Lamp/Alarm Test Completed & OK: Y / N

System Set-up

- Controller Online: A ________ B ________
- B Operator Station in Use: 1 ________ 2 ________
- Centre of Rotation Selected: ______________
- Speed Setting: ________ Knots
- Turn Rate Setting: ________ °/minute
- High Precision Gain Selected: ________ Setting: Low ☐ Medium ☐ High ☐
- Customised Gain Selected: ________ Setting: Surge ☐ Sway ☐ Yaw ☐

Alarm Limits

- Position Alarm Settings: ________ Warning Alarm Enabled: Y / N
- Heading Alarm Settings: ________ Warning Alarm Enabled: Y / N

Power

- Generators Available: #1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐
- Generators Online: #1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐
- Main Switchboard Split: Y / N
- UPS Checked & OK: Y / N

Propulsion

- Thrusters Available for DP Control: #1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐ #7 ☐
- Thrusters Selected: #1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐ #7 ☐
- Thruster #3 on: Bus 1 ☐ Bus 2 ☐
- Rudders Available for DP Control: Port ☐ Stbd. ☐
- Rudders Selected: Port ☐ Stbd. ☐
- Thruster Mode Selected: ______________

Sensors

- Gyros Available: #1 ☐ #2 ☐ #3 ☐
- Gyro in Use: #1 ☐ #2 ☐ #3 ☐
- Differences Checked & Acceptable: Y / N
- Vessel Heading in Use: ____________ °
- Wind Sensors Available: #1 ☐ #2 ☐ #3 ☐
- Wind Sensor in Use: #1 ☐ #2 ☐ #3 ☐
- Differences Checked & Acceptable: Y / N
- Wind Speed & Direction in Use: ____________ Knots ____________ °True
- VRS Available: #1 ☐ #2 ☐ #3 ☐
- VRS in Use: #1 ☐ #2 ☐ #3 ☐
- Differences Checked & Acceptable: Y / N
- Values Used: Heave ☐ Pitch ☐ Roll ☐
- Draught Sensor Available: Y / N
- Draught Input: Sensor ☐ Manual ☐ Operational ☐ Transit ☐
- Draught Input Checked & Acceptable: Y / N
- Draught in Use: ____________ m

Position Reference Systems

Available	In Use	(Accuracies Checked & Acceptable)
Artemis	Y / N	Y / N
DGPS 1	Y / N	Y / N
DGPS 2	Y / N	
Fanbeam	Y / N	Y / N
HPR 1	Y / N	Y / N Transponders ____________ ____________ ____________
HPR 2	Y / N	Y / N Transponders ____________ ____________ ____________
Radius	Y / N	Y / N Transponders ____________ ____________
Taut Wire Port	Y / N	Y / N
Taut Wire Stbd.	Y / N	Y / N
Gate Valves		**Port:** Open ☐ Closer ☐ **Stbd:** Open ☐ Closer ☐

- HPR Poles: Port: Down / Up Stbd.: Down / Up
- ROV Transponder ____________
- Co-ordinate System set to Display UTM Y / N Y / N
- Datum Settings Checked & OK Y / N Y / N

Joystick

- Joystick Thrust: Reduced / Full
- Joystick Precision: High Speed
- General: ________________________
- Low Speed: ________________________
- Joystick Environmental Comp.: Surge ☐ Sway ☐ Yaw ☐
- Joystick Operational: Y / N

Propulsion Status

● Thruster Setpoint/Feedback OK:	Y / N
● Rudder Setpoint/Feedback OK:	Y / N

Power Status

● Power (if Bus is Common):	Used / Available
● Power (if Bus is Split):	
● Bus 1:	Used / Available
● Bus 2:	Used / Available

Communications Tested & OK (as applicable)

● Crane Cab/Cabs:	Y / N
● Deck (Pipe/Cable Lay):	Y / N
● DP Status Lights:	Y / N
● Dive Control:	Y / N
● DP Status Lights:	Y / N
● Engine Control Room:	Y / N
● ROV Control:	Y / N
● DP Status Lights:	Y / N

Checklists

● Dive Checklist Complete:	Y / N
● ROV Checklist Complete:	Y / N
● Engine Room Checklist Complete:	Y / N

Vessel Capability

● Consequence Analysis Enabled:	Y / N
● Capability Plot Set-up & Checked:	Y / N
● Deselect Thrusters:	#1 ☐ (#3) ☐ #5 ☐ #7 ☐ (When #3 is connected to Bus 1)
● Position Maintained:	Y / N Reselect Thrusters
● Deselect Thrusters:	#2 ☐ (#3) ☐ #4 ☐ #6 ☐ (When #3 is connected to Bus 2)
● Position Maintained:	Y / N Reselect Thrusters
● Vessel on Auto DP for 30 Minutes:	Y / N
● DP Current:	____________
● Alarms Page Checked:	Y / N
● Printer Online:	Y / N
● Print Status:	Y / N

Signed: ______________________________________ **Date:** ______________

Signed: ______________________________________ **Date:** ______________

The Nautical Institute

Annex G

Refresher and Competency Assessment Course

February 2025 – Version 1

Disclaimer

While every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. Likewise, The Nautical Institute cannot be held responsible for any damage to property or personnel while following these guidelines. This information is produced in good faith, but The Nautical Institute cannot guarantee the accuracy and/or completeness of the information, which is produced for guidance purposes only.

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Document version control

NI DP Refresher and Competency Assessment Course		
Title	**Version**	**Date**
NI DP Refresher and Competency Assessment Course	1	20/02/2025

Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)
136	Introduction		Merging DP Revalidation and DP Refresher and Competency Assessment Courses
136	Minimum Entry Qualification Requirement	The Refresher Course may be completed up to six months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, in which the DPO must send in an application into The NI.	The Refresher Course may be completed up to twelve months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, in which the DPO must send in an application into The NI.

Table of contents

1. Introduction

The Nautical Institute (The NI) has introduced a DP Refresher and Competency assessment course as a result of NI Training centres running The NI DP revalidation course reporting the benefit of using The NI DP Revalidation course as a DP refresher course and competency assessment. This course can be used to refresh the knowledge of the DPOs at anytime, or for revalidation of DP certificates.

i. The course is an accredited course with its course content and notes controlled by the Nautical Institute. This will ensure an excellent standard across the DP Industry.
ii. Course content is to match exactly The NI DP Revalidation course. This course is an option to be used as part of DP Certificate revalidation requirement.
iii. Course certificate will have the same logo as The NI DP Revalidation course.
iv. Certificate name is "Nautical Institute DP Refresher and Competency assessment".
v. Course is only available for DPOs with current DPO certificates.
vi. The course allows DPOs who have not been working on a DP vessel a method to refresh their knowledge about DP operations, DP Bridge team work, Emergency DP resource management and to stay current with the latest industry guidelines.
vii. The course has a significant component of simulations that include failures. This will be of particular benefit to DPOs who work on vessels which are on DP 24/7.

The contents of the DP Refresher and Competency Assessment Courses and Revalidation Course are similar. The NI agreed to merge the course with DP Revalidation. The single course will be known as the **DP Revalidation / DP Refresher and Competency Assessment Course**.

If a training centre is approved for the Revalidation course, it is also approved for the DP Refresher and Competency Assessment course. The training centre should amend the title of the course to:

DP Revalidation / DP Refresher and Competency Assessment Course

Training centres will not need to administer two separate sets of course materials.

Revalidation and refresher course participants can attend the same course. It is the training centre's responsibility to ensure they meet the ratio of students as per the NI Standard and issue the appropriate certificate on completion of the course.

2. Minimum Entry Qualification Requirements

The minimum entry requirement is a DPO Certificate issued by The NI. The original DPO Certificate should be presented at the DP centre where the DP Refresher Course is completed.

If the DPO has 30 days or more DP sea time, then the DP Refresher and Competency Assessment Course may be completed up to twelve months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, in which the DPO must send an application to The NI.

3. Number of Hours

A minimum of 34 hours of teaching and simulator time is required for this course which includes the time needed for the examination and assessments. The course must schedule both practical and theoretical aspects with about 50% of the time assigned to each. The course is to be delivered over five days.

4. Ratio of Students/Instructors/Equipment

The NI allows a maximum of four students per class being taught by one instructor per one Class B or A Simulator.

By exception and where justified, five or six students may be considered at the discretion of The NI's Accreditation Team, based on the number of simulators in place, rotation of students and the use of the training methodology in place.

When two different types of simulator systems are available in a training centre, the best practice is to keep the trainee on the same simulator throughout the course.

A minimum requirement is to use an NI DP Class B Simulator to correspond with the training objectives for the DP Refresher and Competency Assessment Course.

5. Delivery Method

Training will be split equally between theory and practical exercises. Theory may be used to support the practical exercises either as a briefing, a de-briefing or for demonstration purposes.

6. Course Aims

The course is intended for those who have already been issued a DPO Certificate from The NI and required to refresh their knowledge about DP or need to completed high DP simulator because they are on DP 24/7 The overall course aim is to update the DPOs with the latest rules and regulations, position references and sensors, known DP incidents and lessons learned. At the end of the course, the student should:

6.1 Have acquired knowledge of the latest rules and regulations.

6.2 Have acquired knowledge of the latest developments within sensors and PRS.

6.3 Have acquired knowledge of the latest relevant DP incidents and why they occurred.

6.4 Be able to recognise the various alarm, warning and information messages.

6.5 Be able to carry out operational planning, risk assessment and hazard identification tasks.

6.6 Be able to set up the DP system for a particular task/operation.

6.7 Be able to decide on courses of action because of systems failure.

7. Course Objectives

The following is a list of the objectives that should be attained by the DPOs upon completion of the DP Refresher and Competency Assessment Course.

By the completion of the training session or period for DP Rules and Regulations the trainee should be able to:

7.1 List the various providers of documents containing statutory requirements and guidance relating to DP operations, including:

7.1.1 IMO (including IMO MSC/Circ. 645 of 1994 and 1580 of 2017 Guidelines for Vessels with Dynamic Positioning Systems).

7.1.2 Classification society DP rules.

7.1.3 International Marine Contractors Association (IMCA).

7.1.4 Marine Technology Society (MTS).

7.1.5 IMCA and MTS guidelines for ASOG.

7.2 Explain the purpose of documentation associated with DP operations, such as DP operations manuals, Failure Modes and Effects Analysis (FMEA) and capability plots.

7.3 Describe the IMO (DP) equipment classes and their application, with reference to the IMO Guidelines for Vessels with DP Systems.

7.4 Understand the importance of reporting DP incidents knows where to find DP incident reports and knows how to report DP incidents.

By the completion of the training session or period for DP Sensors and PRS the trainee should be able to:

7.5 Describe the following position reference systems commonly associated with DP installations: Differential GNSS, hydroacoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.

7.6 Describe the failure modes of the following position reference systems: Differential GNSS, hydroacoustic, INS, taut wire, Artemis, FMCW Radar and laser-based systems.

7.7 Describe the following sensors associated with DP installations: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor. ASOG, TAM and CAM.

7.8 Describe the failure modes of the following sensors: vertical reference sensor/unit, motion reference unit, gyro compass, wind sensor (anemometer) and draught input sensor.

By the completion of the training session or period for DP Set-Up the trainee should be able to:

7.9 Ensure the vessel is on DP in accordance with the vessel's class and the vessel's operation manual; complete checklist for class-approved FMEA and ASOG.

7.10 Determine and set alarm and warning limits.

7.11 Evaluate most appropriate PRS for specific DP-operations.

7.12 Select the number of position reference systems required in accordance with the DP class.

7.13 Use correct thruster allocation for a specific operation and weather conditions.

7.14 Test vessel's manoeuvring capability during prevailing weather conditions.

7.15 Determine a Safe Position and minimum distances to stabilise the vessel in DP.

7.16 Obtain information and clearance from eg installation, on issues important for the safe operation of the vessel under DP.

By the completion of the training session or period for DP Bridge Watchkeeping the trainee should be able to:

7.17 Demonstrate a continuous awareness of the vessel's status, operation and impact of operating under DP.

7.18 Recognise the importance of maintaining lookout and awareness of the external situation including weather when controlling a vessel close to installations or other objects.

7.19 Recognise situations in which to call the Master to the bridge.

7.20 Log and report DP station keeping events.

7.21 Monitor position reference systems, sensors and signal quality in anticipation of the possibility of failure causing instant or violent reactions from main engines or thrusters.

7.22 Monitor power output and thrust.

7.23 Monitor thruster efficiency for station keeping at different headings and draughts, which may affect DP Class.

7.24 Recognise DP-related changes in vessel systems and technical equipment which may affect DP Class

7.25 Recognise technical and operational issues that may limit or stop DP operations

7.26 Monitor that the DP operating parameters of continuous operating power are not exceeded.

By the completion of the training session or period for Position Keeping the trainee should be able to:

7.27 Recognise alarms related to the incorrect operation of the DP-system and maintaining position.

7.28 Acknowledge alarms within time constraints.

7.29 Discuss alarms with relevant department.

7.30 Evaluate the possible consequences of each alarm and possibility to continue the operation.

7.31 Analyse the consequence analysis alarm.

7.32 Interpret visual indicators, indicating conditions which may result in malfunction of DP.

7.33 Monitor movement of the vessel and changes in the position and heading, in keeping with safe excursion limits deending upon the ongoing task/operations.

7.34 Monitor movement of the object/installation/target.

7.35 Monitor by various means, changes in distance/heading between object and own vessel (if applicable).

7.36 Recognise limitations of vessel movement when having equipment or divers deployed.

By the completion of the training session or period for Environmental Conditions the trainee should be able to:

7.37 Recognise changes in environmental conditions.

7.38 Recognise when environmental conditions become critical with reference to station keeping.

7.39 Recognise increased importance of situational awareness when operating close to floating objects.

By the completion of the training session or period for Alarms and Indicators the trainee should be able to:

7.40 Identify the procedures to follow for DP and non-DP alarms

7.41 Identify the procedures for when to change DP Alert status (eg from green to amber/yellow, or red).

By the completion of the training session or period for Change of DP Watch the trainee should be able to:

7.42 Prepare a hand-over checklist.

7.43 Transfer vessel's status and DP-details when handing over the watch (where not covered by the watchkeeping checklist).

7.44 Provide an update on the ongoing operation and planned operational activities.

7.45 Review a hand-over checklist.

7.46 Verify vessel's position or movement and status.

7.47 Interpret all necessary information of vessel and operation.

7.48 Take-over/hand over DP-watch in a formal and clear manner.

7.49 Determine the DP-status and recent occurrences that may have an effect on the DP operation during the watch.

By the completion of the training session or period for Normal Completion of a DP Operation the trainee should be able to:

7.50 Identify safe departure route and best vessel heading for departure

7.51 Recognise external dangers prior to departure

7.52 Identify an Emergency Escape route which may or may not be the same as the normal departure route

7.53 Retrieve Position Reference System Equipment from eg the installation or seabed (if applicable and as part of a Departure checklist)

7.54 Demonstrate moving to a safe position in appropriate steps

7.55 Recover/retract deployed equipment (if applicable).

By the completion of the training session or period for Operating in Joystick Mode (DP Joystick) the trainee should be able to:

7.56 Stop the vessel at a pre-determined position.

7.57 Determine the need to stop the vessel completely before switching to DP control (system specific).

7.58 Operate the DP joystick to maintain position and/or heading in a controlled and safe manner.

7.59 Operate the DP joystick to change position and/or heading in a controlled and safe manner.

7.60 Demonstrate DP joystick station keeping of the vessel under prevailing weather conditions.

By the completion of the training session or period for Emergency Situation the trainee should be able to:

7.61 Move the vessel to a safe position in a safe and controlled manner.

7.62 Demonstrate an awareness of the Emergency Escape Route.

By the completion of the training session or period for Emergency Performance/Response the student must demonstrate at least two of the following:

7.63 Demonstrate actions in case of unstable Position Reference System(s).

7.64 Demonstrate actions when losing Position Reference System(s).

7.65 Demonstrate actions if Position Reference System(s) suddenly indicate significant changes in position/range/bearing data.

7.66 Demonstrate actions in case of error in wind input.

7.67 Demonstrate actions in case of a DP drive-off.

7.68 Demonstrate actions in case of a DP drift-off.

7.69 Demonstrate actions in case of a DP force-off.

7.70 Demonstrate actions in case of one thruster run-off.

7.71 Demonstrate actions in case of error in sensor input.

7.72 Demonstrate the proper sequence of actions if experiencing an onboard emergency which may influence DP-control during DP operations.

7.73 Explain actions when losing all DP control functions.

7.74 Explain the proper sequence of actions if colliding or about to collide with an installation, nearby objects or vessels during DP-operations.

8. Course Assessment

The assessment for the DP Refresher and Competency assessment Course includes a theoretical (NI online) exam and a practical assessment. Each component must be completed successfully. There is no specific order in which they must be completed. After the course is completed, an entry will be made in the appropriate logbook.

9. Online Assessment

In order to be awarded a certificate of completion for the DP Refresher and Competency assessment Course ,the DPO must pass an online assessment at the training centre.

The exam is composed of multiple-choice questions that have already been developed from the Basic/Induction Course and the Simulator Course. The online assessment will consist of 30 questions and shall be completed in one hour with a pass mark of 70%.

Students who fail the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. If the student fails these three attempts, the student is required to repeat the Refresher course and Competency Assessment course and undertake the assessment again.

10. Practical Assessment

The practical assessment must be done individually. The practical assessment shall include the following items, which the student must pass to be awarded a certificate of completion for the course:

i. Complete a DP Checklist.
ii. Set up the vessel on DP.
iii. Move the vessel from set-up position to a worksite.
iv. Deal with a system/sensor/thruster failure or environmental change (at least two).

The training centres must develop their own practical exams based upon the course objectives listed above.

The student must pass all the four items listed above. The training centre is responsible for ensuring that the assessment is carried out in a professional manner and that the student is assessed with thoroughness in line with the standards of The NI.

10.1 Practical Assessment Guidance for Training Centres

Below you will find guidance for the development and the examination process for the practical assessment for the DP Refresher and Competency Assessment Course.

10.1.1 General Guidance

- Duration of practical assessment: Between one and two hours.
- Pass or fail criteria: This item will be the most challenging. The student performance is evaluated by the instructor and in an ideal world; such an evaluation should be objective. Although the student must pass all items it could be that some items are performed as a "pass" whilst other items could be defined as "fail". It will be the overall performance of the student that determines if the practical assessment is a pass or fail. For example, failing to identify a small position deviation from one of the PRS inputs would not necessarily mean that the student fails, but failing to identify that the vessel has lost DP Class and that the vessel is now operating without redundancy, would. Depending on the nature of the fail it is up to the DP Training Centre to determine if the student should be allowed to retake the practical assessment. If the fail is related to safety critical items, as determined by the Training Centre, the student should not be allowed to retake the assessment, but should retake the course. Reason(s) for failing the student should be given to the student in writing.
- Students who fail at the first attempt, and are allowed to retake the practical assessment, can do this only once. The second attempt must be agreed with the DP Training Centre and carried out at the training centre's convenience.

10.1.2 Practical Assessment Scenario Guidance

i. Exam Scenario

After passing the written exam, each student will randomly draw a number linked to the scenario they will be examined on.

Scenarios are to be based on the course training objectives. All scenarios should be equal in complexity.

Each scenario will end with the vessel located at a worksite in close proximity to a platform/structure, such as a fixed platform, a semi-submersible rig or another vessel.

Based on the task to be performed by the vessel (at the worksite), there should be at least two possible locations where the vessel can be positioned to complete the task (one drift-on and one drift-off). The student will be expected to choose the better of the two. The following are two examples of scenarios that could be used. The vessel might be required to do an ROV inspection of a platform where there is sufficient tether available to work at both locations. The vessel might be required to position under a crane for cargo operations where there are two cranes available (one upwind and one downwind).

Each centre shall develop its own practical exam scenarios based on the DP equipment fitted and the simulated platforms/structures it has available.

The centre will have 10 to 15 scenarios available for exam purposes. This will permit all students to have a random selection. Multiple scenarios can be created by using the same structure/vessel/task and simply changing the environmental conditions.

Time for planning the practical assessment shall be allocated to the student. 20 minutes before the exam, each student will be presented with their scenario. This will permit the student time to develop a plan as to how they will proceed. One student can carry out the exam while the other is planning, this will save time during the exam process.

Prior to starting the exam, the student will be asked to state the planned vessel position and heading when at the final worksite. The student will also state the direction from which (bearing) they will approach the worksite and the desired heading at exercise start. All students will start at the same distance from the worksite. Before starting the exam, the instructor will place the vessel (exercise start position) on the bearing and heading specified by the student.

ii. Checklist/Set up on DP

The DP checklist below is a sample only. It indicates the extent to which checks are to be conducted and the content required. Each centre will develop its own checklist based on parameters including DP equipment fitted, vessel power plant, thrusters and reference systems fitted. The flow and layout of the checklist would also be as required by the individual centre. The centre may wish to increase the content of the checklist and is free to do so.

There are items that may be omitted. For example, the sample below has two means of determining vessel capability after worse case failure (DP capability plot and deselecting thrusters). Only one means would be required.

The sample below would take approximately 20 to 25 minutes for someone who is familiar with the DP system/vessel. Ability of the individual student will vary. The students are to use the same checklist for the exam as for course exercises. They will also be informed that the checklist is part of the exam.

Some items on the checklist will require the vessel to be set up on DP. Therefore at some point during completion of the checklist, the student will place the vessel in DP mode.

Based on the results of the checklist, the student can request changes to generator, power, switchboard or thruster configurations. The student may also alter the planned approach route and final worksite heading/position, based on the results of the checklist.

iii. Approach to worksite

After completing the checklist and set-up on DP, the student will move the vessel to the worksite. The speeds and methods used by the individual student will vary. If the vessel is outside the 500m zone at the start, this could take considerable time. As a benchmark, a single move of 500m at 0.25m/sec would require 33 minutes. The actual moves during the exam will be undertaken in increments and at varying speeds, making it difficult to indicate an actual time for this item. To reduce time requirements, for exam purposes, the exam may start at a distance of 250 to 300m from the worksite.

iv. At the worksite

The actual vessel task at the worksite can be as determined by the training centre. This might be diving operations, ROV operations, cargo operations or similar.

The type of practical assessment (ie DP operation) should have been reflected or revised during the DP Refresher and Competency Assessment Course.

The last stage of the exam will introduce a DP fault/failure or environmental change for the student to deal with.

This specification identifies possible faults and indicates that at least two must be utilised. Both can be introduced after the vessel is on location at the worksite but one must be introduced at this stage. The other can be introduced at any stage in the exam, after the vessel is set up on DP. Considering the above, the exact timing of fault injection and the faults to be used, with a particular scenario, will be determined by the training centre.

v. Exam time required

If the exam starts at a distance of 250m from the worksite, the total time required for the practical exam should be one to two hours per student. The extent to which the simulated DP operation progresses (after positioning at the worksite) is determined by the training centre.

The first student will require more time as they would require time to plan (20 minutes). Subsequent students would get the same amount of planning time but would be doing so while another is being examined.

10.1.3 Practical Assessment Mark Sheet Example

Each Training Centre must ensure that the training objectives are assessed in a proper manner. It might be difficult to assess each student on all training objectives.

Therefore, it would be recommended that a selection of training objectives should be covered during the assessment.

Below are the items to be evaluated during the practical assessment. Exercises are to be structured to enable evaluation for the items listed below.

11. Mark Sheet Exam Number 1

Practical Assessment DP Refresher and Competency Assessment Course

Name of student:	Exercise name/ number:	Overall Pass/Fail	Instructor sign
	1		

Task no:	Task description: DP Planning	Pass	Fail
1	Carry out operational planning, risk assessment and hazard identification tasks.		
2	Evaluate most appropriate PRS for the DP operation, in accordance with the DP class.		
3	Determine the most appropriate final working position and heading.		
4	Identify emergency escape route.		
Additional Comments:			

Task no:	Task description: DP Set-Up	Pass	Fail
1	Complete DP checklist with accurate recording of data.		
2	Select DP joystick mode. Operate the DP Joystick to maintain position and/or heading in a controlled and safe manner.		
3	Set up the vessel on DP in a controlled and safe manner.		
4	Use correct thruster allocation for the operational and environmental conditions.		
5	Ensure the vessel is on DP in accordance with the vessel's required class; for the operation being conducted (determine capability).		
6	Determine and set appropriate alarm and warning limits for the operation being conducted.		
7	Select appropriate gain setting.		
Additional Comments:			

Task no:	Task description: DP Operations	Pass	Fail
1	Move the vessel to the final working location using appropriate movement steps.		
2	Move the vessel to the final working location at safe speed/speeds.		
3	At the final working location, select appropriate and reliable PRS in accordance with the DP class.		
4	Monitor and recognise any changes in position reference system or sensor performance.		
5	Monitor and recognise any change in power or thrust output.		
6	Monitor and recognise any changes in environmental conditions.		
7	Continue to ensure the vessel is on DP in accordance with the vessel's required class, for the operation being conducted (monitor capability).		
Additional Comments:			

Task no:	Task description: DP Failure Modes	Pass	Fail
1	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode:		
2	Recognise and respond to fault/system failure/environmental change and associated alarms. Specify failure mode:		
3	Evaluate the possible consequences of each alarm and the effect on continuing the operation.		
4	Change DP Alert status (eg from green to amber/yellow, blue/white or red) to reflect operational condition.		
Additional Comments:			

12 DP Refresher Course timetable

Below is a suggested timetable, which can be used for the DP Refresher and Competency Assessment Course.

DAY – 1		
Time	**Subject**	**Comments**
AM	Registration Introduction – Experience mapping. Familiarisation with centre equipment.	Experience mapping would be a vital part of the Course. The previous experience and knowledge of the participants must be addressed and acknowledged during the course.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 2		
Time	**Subject**	**Comments**
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 3		
Time	**Subject**	**Comments**
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 4		
Time	**Subject**	**Comments**
AM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.
AM	Exercise briefing and exercise planning	Planning to be monitored by the instructor and guidance given as needed. Guidance can be tailored to incorporate course objectives where the opportunity presents.
Lunch		
PM	Run exercise	Exercise designed to meet course objectives.
PM	Debrief exercise	Debrief can be tailored to incorporate course objectives where the opportunity presents.
PM	Lecture covering course objectives	Centre to decide content of the lecture, keeping to course objectives.

DAY – 5		
Time	**Subject**	**Comments**
AM	Practical and theoretical examination	Practical examination on a minimum NI Class B Simulator. Theoretical On-Line examination.
Lunch		
PM	Examination continued, if required.	

13. DP Checklist

Below is a suggested DP Checklist, which can be used for the Refresher Course.

DP Checklist

• Date:	________________
• Time:	________________
• Location:	________________
• Position:	N ________ E ________
• Water Depth:	________________
• Light/Shapes (On/Up):	Y / N
• Read Latest Forecast:	Y / N
• Lamp/Alarm Test Completed & OK:	Y / N

System Set-up

• Controller Online:	A ________ B ________
• B Operator Station in Use:	1 ________ 2 ________
• Centre of Rotation Selected:	________________
• Speed Setting:	________ Knots
• Turn Rate Setting:	________ °/minute
• High Precision Gain Selected:	________ Setting: Low ☐ Medium ☐ High ☐
• Customised Gain Selected:	________ Setting: Surge ☐ Sway ☐ Yaw ☐

Alarm Limits

• Position Alarm Settings:	________ Warning Alarm Enabled: Y / N
• Heading Alarm Settings:	________ Warning Alarm Enabled: Y / N

Power

• Generators Available:	#1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐
• Generators Online:	#1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐
• Main Switchboard Split:	Y / N
• UPS Checked & OK:	Y / N

Propulsion

• Thrusters Available for DP Control:	#1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐ #7 ☐
• Thrusters Selected:	#1 ☐ #2 ☐ #3 ☐ #4 ☐ #5 ☐ #6 ☐ #7 ☐
• Thruster #3 on:	Bus 1 ☐ Bus 2 ☐
• Rudders Available for DP Control:	Port ☐ Stbd. ☐
• Rudders Selected:	Port ☐ Stbd. ☐
• Thruster Mode Selected:	________________

Sensors

- Gyros Available: #1 ☐ #2 ☐ #3 ☐
- Gyro in Use: #1 ☐ #2 ☐ #3 ☐
- Differences Checked & Acceptable: Y / N
- Vessel Heading in Use: ____________ °
- Wind Sensors Available: #1 ☐ #2 ☐ #3 ☐
- Wind Sensor in Use: #1 ☐ #2 ☐ #3 ☐
- Differences Checked & Acceptable: Y / N
- Wind Speed & Direction in Use: ____________ Knots ____________ °True
- VRS Available: #1 ☐ #2 ☐ #3 ☐
- VRS in Use: #1 ☐ #2 ☐ #3 ☐
- Differences Checked & Acceptable: Y / N
- Values Used: Heave ☐ Pitch ☐ Roll ☐
- Draught Sensor Available: Y / N
- Draught Input: Sensor ☐ Manual ☐ Operational ☐ Transit ☐
- Draught Input Checked & Acceptable: Y / N
- Draught in Use: ____________ m

Position Reference Systems

Available	In Use	(Accuracies Checked & Acceptable)
Artemis	Y / N	Y / N
DGPS 1	Y / N	Y / N
DGPS 2	Y / N	
Fanbeam	Y / N	Y / N
HPR 1	Y / N	Y / N Transporders ____________ ____________ ____________
HPR 2	Y / N	Y / N Transporders ____________ ____________ ____________
Radius	Y / N	Y / N Transporders ____________ ____________
Taut Wire Port	Y / N	Y / N
Taut Wire Stbd.	Y / N	Y / N
Gate Valves		**Port:** Open ☐ Closer ☐ **Stbd:** Open ☐ Closer ☐

- HPR Poles: Port: Down / Up Stbd.: Down / Up
- ROV Transponder ____________
- Co-ordinate System set to Display UTM Y / N Y / N
- Datum Settings Checked & OK Y / N Y / N

Joystick

- Joystick Thrust: Reduced / Full
- Joystick Precision: High Speed
- General: ________________________
- Low Speed: ________________________
- Joystick Environmental Comp.: Surge ☐ Sway ☐ Yaw ☐
- Joystick Operational: Y / N

Propulsion Status

- Thruster Setpoint/Feedback OK: Y / N
- Rudder Setpoint/Feedback OK: Y / N

Power Status

- Power (if Bus is Common): Used / Available
- Power (if Bus is Split):
- Bus 1: Used / Available
- Bus 2: Used / Available

Communications Tested & OK (as applicable)

- Crane Cab/Cabs: Y / N
- Deck (Pipe/Cable Lay): Y / N
- DP Status Lights: Y / N
- Dive Control: Y / N
- DP Status Lights: Y / N
- Engine Control Room: Y / N
- ROV Control: Y / N
- DP Status Lights: Y / N

Checklists

- Dive Checklist Complete: Y / N
- ROV Checklist Complete: Y / N
- Engine Room Checklist Complete: Y / N

Vessel Capability

- Consequence Analysis Enabled: Y / N
- Capability Plot Set-up & Checked: Y / N
- Deselect Thrusters: #1 ☐ (#3) ☐ #5 ☐ #7 ☐
  (When #3 is connected to Bus 1)
- Position Maintained: Y / N Reselect Thrusters
- Deselect Thrusters: #2 ☐ (#3) ☐ #4 ☐ #6 ☐
  (When #3 is connected to Bus 2)
- Position Maintained: Y / N Reselect Thrusters
- Vessel on Auto DP for 30 Minutes: Y / N
- DP Current: ____________
- Alarms Page Checked: Y / N
- Printer Online: Y / N
- Print Status: Y / N

Signed: ______________________________ **Date:** ______________

Signed: ______________________________ **Date:** ______________

The Nautical Institute

Annex H

DP Emergency Shiphandling Course

February 2025 – Version 1

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Document version control

NI DP Emergency Shiphandling Course		
Title	**Version**	**Date**
NI DP Emergency Shiphandling Course	1	20/02/2025

Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)

Table of contents

1. Introduction

The Nautical Institute (The NI) DP Emergency Shiphandling Course has been designed to provide industry guidance for participants who engage in manual shiphandling activities in vessels operating in Dynamic Positioning mode. The course will enhance the safety of navigation in confined water and in close quarter to oilfield structure to increase the OOW/DPO situation awareness, risk assessment and management under different emergency situations and environmental conditions. It covers the learning objectives, practical assessment, the assessment skills tables and information about continuous assessment.

The expectation is that the participant will have successfully completed a Dynamic Positioning Operator training programme. The course is suitable for DPOs seeking to enhance their skills and suitable for experienced DPOs who may require refreshing their manual shiphandling skills and officers new to offshore vessels.

The course will cover shiphandling duties on DP vessels.

The programme involves a course of study with continuous assessment during the course. The overall emphasis of the course is:

1.1 To provide emergency shiphandling training for certificated and prospective DPOs.

1.2 DP vessel shiphandling knowledge and practical exercises for deck officers and Masters.

1.3 To use this course in compliance with onboard competency assessment as per:

1.3.1 IMCA M117 The training and experience of key DP Personnel.

1.3.2 IMCA C002 IMCA Guidance on Competency Assurance and Assessment – Marine Division.

1.3.3 IMCA C007 Guidance on Assessor Training.

1.3.4 STCW Table A-II/1.

1.4 To ensure that candidates are prepared for emergency situations in which manual shiphandling techniques are required AND the circumstances in which the change to manual should not be made.

1.5 The course comprises two parts:

1.5.1 Classroom – Instruction (Theoretical part maybe conducted on the Navigational Bridge Simulator) to have a ship-like atmosphere and to have descriptive materials at hand, immediate use of material during briefing and debriefing of theory and exercise).

1.5.2 Simulator - Upon successful completion of the course the participants will be able to demonstrate competence in a number of shiphandling emergency scenarios. The participants will be proficient in conning the vessel in different operational situations and loss of equipment.

2. Minimum Entry Qualification Requirements

The minimum entry requirement is that participants should hold a deck Officer Certificate (Officer of the watch (OOW), Chief Mate, Master or Cadet) or DPO qualification.

3. Course Aims

The aims of the course are to give the student the following:

3.1 Confidence to respond appropriately to major failure in the Dynamic Positioning control systems.

3.2 Ability to make the decision when to change to Manual control.

3.3. An improved understanding of shiphandling in the context of offshore operations.

3.4 Experience of keeping the vessel safe through manual shiphandling skills in a range of conditions.

4. Course Objectives

The course includes conventional and azimuth propulsion simulation, use of thrusters, manoeuvring in sheltered waters and offshore environments including close quarters manoeuvring, holding a vessel in one position after an emergency and operating with reduced machinery capability.

The theory content will revise basic principles of shiphandling including:

4.1 Discussion of wind/current, and their influence on the operation in adverse weather/wind condition.

4.2 Planning of (safe) operation.

4.3 Manoeuvring theory with focus on offshore support vessels.

4.4 The effects of displacement, draught, trim, speed, velocity, kinetic energy and under-keel clearance on various manoeuvres, squat effect, turning circles and stopping distance.

4.5 The importance of the pivot point and its effect on shiphandling on vessels that are moving and not steaming.

4.6 The effect of current, wind and waves on the vessel's capabilities when vessel is on different headings.

Specific focus on offshore activities will include:

4.7 The effect and interaction between different type of rudders and propellers, thrusters and their operational advantages and limitations.

4.8 Advantages and disadvantages of different types of thrusters.

4.9 Contingency planning in case of thruster, rudder and/or propeller failure.

4.10 Contingency operation in the event of a partial blackout.

4.11 Correct procedures for changeover between manual, joystick and dynamic positioning manoeuvring modes.

4.12 Effect of a loss of heading when on DP and vessel turning beam on to conditions.

4.13 Safe operation in different weather conditions.

4.14 Thruster loss at low speed.

4.15 Manoeuvring without bow thrusters.

4.16 Emergency shiphandling after a worst-case failure.

4.17 Stopping distance when maintaining heading.

4.18 Effect of external forces on a vessel.

Documentation Safety

The course will cover critical safety-related aspects including:

4.19 Use of emergency backup systems.

4.20 Holding position in open water and in channels after system failure.

4.21 Thruster emergency stops.

4.22 Alarms associated with propulsion systems.

5. Learning Objectives

The expected learning outcome is that the students will be able to describe or demonstrate the following:

Vessel Machinery Characteristics

5.1 Types of Main Propulsion

5.1.1 Describe use of the major types of main propulsion systems including:

i. Conventional twin/single-screw.
ii. Azimuthing propulsion.

5.1.2 Compare the advantages and disadvantages of the major types of main propulsion systems.

5.1.3 Utilise the features of various azimuth type propulsion systems.

5.2 Propellers

5.2.1 Understand the difference between fixed-pitch and controllable pitch propulsion (CPP) propellers.

5.2.2 Compare the advantages and disadvantages of fixed-pitch and controllable pitch propellers.

5.3 Azimuthing Bow Thrusters

5.3.1 Describe the benefits of using azimuthing bow thrusters including their use in pulling power and manoeuvrability when pivot point is on the stern.

5.4 Tunnel Thrusters

5.4.1 Describe the advantages and disadvantages of tunnel thrusters.

5.4.2 Describe the differences between fixed-pitch and controllable pitch tunnel thrusters.

5.4.3 Identify how the characteristics of water flow, hull design and speed of the vessel affect the efficiency and effectiveness of a tunnel thruster.

5.5 Rudders

5.5.1 Describe the use of different configurations and types of rudders including: high-lift rudder, fishtail, conventional rudders and split rudders to increase side thrust.

5.5.2 Understand the advantages and disadvantages of each rudder type.

5.6 Power Management Systems (PMS)

5.6.1 Describe the functionality of a PMS.

5.6.2 Describe and understand how the PMSs may affect power availability in an emergency shiphandling situation.

Vessel Manoeuvring Characteristics

5.7 Pivot Point of the vessel

5.7.1 Describe the effect that the use of different thrusters located at different positions on the hull has on the pivot point.

5.7.2 Describe the effect that trim has on a vessel's manoeuvring characteristics.

5.8 Environmental Forces

5.8.1 Describe an understanding of the effect that wind, sea and current have on a vessel's manoeuvring characteristics.

5.8.2 Describe an understanding of the forces of wind and current based on the ship's hull coefficient and wind and current force and relative direction.

5.9 Other Factors

5.9.1 Describe the ability to manoeuvre a vessel under varying environmental, hydrodynamic and ship pivot point conditions.

Vessel Manoeuvring Modes

5.10 Traditional Manoeuvring

5.10.1 Describe the process of manual shiphandling and station keeping using individual thrusters.

5.10.2 Describe proper use of thrusters, rudders and azimuthing propulsion systems to manoeuvre a vessel in varying sea conditions with no defects.

5.10.3 Describe the use of fixed pitch and CPP azimuth thrusters with and without biasing.

5.10.4 Describe the standard Offshore use of the aft control to berth and unberth.

5.11 Heading Control and Joystick Manoeuvring

5.11.1 Describe changing centre of rotation and power requirements.

5.11.2 Describe advantages of a set heading.

5.11.3 Describe an understanding of the difference between an Independent joystick and a DP system joystick.

5.11.4 Describe the importance of setting centre rotation to the centre of the vessel.

5.11.5 Describe the correct use of weather and data inputs as these relate to heading control.

5.12 DP Manoeuvring

5.12.1 Describe changing rotation centres and power requirements of a DP system.

5.12.2 Describe advantages of set heading when using a DP system.

5.12.3 Describe the ability to manoeuvre using joystick under varying environmental, hydrodynamic and ship pivot point conditions.

Operating Procedures & Risk Assessment

5.13 Operating Procedures & Risk Assessment:

5.13.1 Describe the importance of procedures and safety guidelines as they apply to offshore marine operations. IMCA, MTS and Guidelines for Offshore Marine Operations (GOMO).

5.13.2 Describe the importance of industry best-practice in establishing a safe working environment.

5.13. 3 Understand the use of risk assessment processes and the benefits of assessing the risks in mitigating hazards.

5.14 Company-Specific Procedures with respect to industry best practices

5.14.1 Discuss the procedural considerations for operating alongside a platform.

5.14.2 Describe scenarios when an operation may be suspended.

5.14.3 Define risk assessment and management of change as applied to a company's procedures.

5.14.4 Describe the ability to apply procedures and risk assessments for a specific operation.

5.14.5 Describe ASOG, CAM and TAM modes.

Special Manoeuvring Scenarios including Emergency Shiphandling

5.15 Working alongside an installation

5.15.1 Define the information required before approaching an installation.

5.15.2 Define the information that may be found on a rig data card.

5.15.3 Utilise the information from current and detailed weather reports

5.15.4 Describe the importance of crane information.

5.15.5 Describe the process for setting up for "Drift-on" and "Drift-off" side working.

5.15.6 Describe the ability to follow approach and departure procedures.

5.15.7 Describe the effect of changing trim and excessive trim.

5.16 Operating with reduced equipment due to equipment failure

5.16.1 Describe the effect that a loss of bow thrusters on an azimuth propulsion ship may have on manoeuvrability and station keeping.

5.16.2 Describe the effect that a loss of stern thrusters on conventional twin-screw vessel may have on manoeuvrability and station keeping.

5.16.3 Demonstrate how to manoeuvre using only azimuth thrusters (biasing and non-biasing techniques).

5.16.4 Describe the use of engines and rudders in the event of thruster failure.

5.16.5 Describe the ability to overcome equipment failure while maintaining safety of vessel.

5.16.6 Describe actions to be taken after DP failures with the simulator in DP auto mode

6. Number of Hours

The course will be of at least four days' duration with a minimum of 32 hours' instruction, with at least 65% of the time assigned to practical shiphandling exercises1.

7. Ratio of Students/Instructors/Equipment

The course will be run in English. The student-to-instructor/simulator ratio will be a maximum of three students to one instructor/simulator.

Course to be conducted at a Nautical Institute accredited Training centre. The instructor must be appropriately qualified and experienced including qualifications as a simulation instructor and relevant seagoing professional qualifications.

The instructor may be assisted by a ship's Master experienced in offshore vessel shiphandling.

Note: The Nautical Institute will consider submissions for a shorter course with fewer students provided that a minimum of nine hours actual bridge exercise time in control of the ship is assigned to each participant

8. Instructor Qualifications

Instructors must be approved instructors under The NI DPO Scheme.

The instructor/s delivering the course must be approved as an instructor at a NI accredited training centre. They must be able to demonstrate that they possess the adequate shiphandling knowledge that affirms them to be sufficiently competent to deliver the course.

9. Delivery Method

The course will be a blend of learning provided by theory-based instruction with guided practical simulator- based exercises giving a balance of lectures, instruction and practical assessments. This will be achieved through a concentrated period of exercises on a DP equipped shiphandling simulator, supported by a programme of lectures and instruction. This course may also be delivered, in part, using individual computers for training.

10. Course Assessment

The course will include both a theoretical and practical assessment.

11. Online Assessment

An NI multiple-choice online assessment will be completed by each student at the end of the course. Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. Failing these three initial attempts, the student is required to repeat the Shiphandling Course and undertake the assessment again.

12. Practical Assessment

Practical assessments will be based on the conduct of each exercise and will determine the candidate's preparedness for manual shiphandling in emergency situations.

Training centres must develop their own practical exams based upon the course objectives listed above and Course Skills Table below.

The practical assessment must be done individually. As a minimum, the exam must require the student to hold station after a DP emergency (for a specified period of time) and then move the vessel to a safe location under manual control. The time period for holding station will be dependent on the time required to abandon the operation underway at the time of the failure.

The training centre is responsible for ensuring that the assessment is carried out in a professional manner and that the student is assessed with thoroughness in line with the standards of The NI. Candidates who successfully complete the online examination and practical assessments will receive a completion certificate. Unsuccessful candidates will be advised to seek further training to meet their particular needs.

13. Specific Equipment Requirements

Simulator equipment required to run the course:

13.1 Nautical Institute Shiphandling Simulator OR a simulator that will match the requirement of NI Shiphandling simulator.

14. Appendix 1 to DP Emergency Shiphandling - Learning and Proficiency Outcomes

DP Emergency Manoeuvering Course Skills Table		
S = Skilled K = Knowledgeable A = Aware The course will include exercises using a variety of propulsion control techniques including: ● Change over procedures from DP to manual. ● Emergency on DP controller. ● Joystick use. ● Manual manoeuvring. ● Emergency operation. ● Thruster emergency stops. ● Emergency Bridge resource management. Training and practical sessions should address skills in a variety of environmental conditions including daylight and darkness.		
Knowledge, Understanding and Proficiency	**Methods for demonstrating competence** (To be completed by the Centre)	**Criteria for evaluating competence** (To be completed by the Centre)
Control		
Familiar with the operation and testing procedures of all bridge manoeuvring equipment.		
Steering, main engine and thruster control systems fully operational in manual control only.		
Bring the vessel to a complete stop so it is making no way through the water in minimum time without over use of engines.		
Knowledge of propulsion/steering systems and their controls, including partial blackout or loss of power contingencies and emergency control systems.		
Controlling the vessel with independent propulsion units.		
Controlling the vessel with Joystick.		
Maintaining the vessel in one position without changing the heading, in the vicinity of a fixed reference point/object with full and restricted propulsion availability.		

Manoeuvring the vessel to port and starboard or fore and aft, keeping the heading within 10 degrees, in the vicinity of a fixed reference point/object with full and restricted propulsion.		
Transferring in and out of DP to joystick to manual control.		
Manoeuvring and controlling the vessel as listed above, after Worst Case failure (WCF) of		
Manoeuvring the vessel in DP DR Mode after loss of all position reference systems.		
Demonstrate how to allow for prevailing wind, currents, tidal stream and expected changes.		
Demonstrate situational awareness in respect of subsea pipelines, wellhead and platform riser locations.		
Emergency planning.		
Partial loss of propulsion power.		
Sudden changes in wind direction/strength.		
Aware of the actions in case of emergency when vessel is in DP auto mode eg WCF, Thruster, generators and Steering Failure.		
Manoeuvring and controlling the vessel (box patterns/heading changes) in the vicinity of a fixed reference point/object or by using DGNSS with full or restricted propulsion availability.		

Example Simulator Exercises For Shiphandling

Trainee must be able to:

14.1 Set up a vessel ready for emergency departure from installations.

14.2 Take appropriate initial actions in response to system failure.

14.3 Hold the vessel in the one position and keep the heading within 10 degrees in good and adverse weather/wind condition using only CPP/FPP azimuths and thrusters after a worst case failure. Monitor vessel speed with DGPS or DP screen.

14.4 Move the vessel sideways away from danger only using CPP/FPP azimuths and thrusters after a worst case failure.

14.5 Demonstrate situational awareness both visually and with electronic aids.

14.6 Demonstrate emergency DP Bridge Resource Management skills.

15. Appendix 2 to DP Emergency Shiphandling – Course Structure

The course must be a minimum of 32 hours duration including the assessment periods and must have a minimum of 20 hours assigned to exercises in the simulator.

Note: The Nautical Institute will consider submissions for a shorter course with fewer students provided that a minimum of nine hours actual bridge exercise time in control of the ship is assigned to each participant.

The Nautical Institute

Annex I

Training and Certification Scheme for Key Technical DP Personnel
(The DP Vessel Maintainer Course)

February 2025 – Version 1

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Document version control

NI Training and Certification Scheme For Key Technical DP Personnel (The DP Vessel Maintainer Course)		
Title	**Version**	**Date**
NI Training and Certification Scheme For Key Technical DP Personnel (The DP Vessel Maintainer Course)	1	20/02/2025

Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)
174	Minimum Entry Requirement		Added: Electro-technical rating Regulation III/7

Table of contents

1. Introduction

This document provides guidance on the Nautical Institute Training and Certification Scheme

For Key Technical DP Personnel (The DP Vessel Maintainer Course) for onboard Technical Staff wishing to gain the Nautical Institute Training and Certification Scheme For Key Technical DP Personnel (The DP Vessel Maintainer Course) and training providers wishing to be accredited to deliver Nautical Institute Key Technical DP Personnel Training – DP Vessel Maintainer Part One Theory.

Short code for this scheme is DPVM.

This accreditation scheme has been developed to cover IMCA M 117 - The Training and Experience of Key DP Personnel section 6.4 Training Courses for Key Technical DP Personnel and Appendix Two and Appendix Three. The scheme also takes into consideration the following documents:

OCIMF Dynamic Positioning Assurance Framework Risk-Based guidance 2016, OCIMF DP FMEA Assurance Framework Risk Based Guidance 2020, MTS- Guidance for Professional Development of DP Personal -PDDP2 and the Nautical Institute course "DP Knowledge for Technical Staff".

The course is designed to provide technical staff with the knowledge required to understand the redundancy concept for DP operations. The course is for technical staff who have a good knowledge of ships systems and therefore only covers the redundancy aspect of onboard systems to ensure safe DP operations.

A DP vessel depends on redundancy of all systems onboard to ensure safe operations. Technical staff need to be able to identify the correct redundant set-up of all systems, identify loss of redundancy in any system and therefore understand when a vessel may have to suspend operations.

2. Development of the Scheme

The scheme was developed based on feedback from the industry and students who have taken the DP Knowledge for Technical Staff course and The NI instructors who conducted the course.

The scheme consists of:

- A training centre course based on The NI DP Knowledge for Technical Staff that has been refined after feedback.
- The NI Online exam, which was part of the course, with additional questions.
- A requirement for onboard DP sea time.
- Completion of a task logbook to record vessel specific training.

This document contains full details.

3. The Role of The NI

The Nautical Institute facilitates and administers the accreditation of dynamic positioning training centres and the certification of DP operators as per the standard agreed by industry and flag administrations. The DP Vessel Maintainer scheme will add a holistic approach covering both deck and engine room departments for the safe operation of a DP vessel.

4. International Safety Management (ISM) Code and DP Training

The scheme is considered as training towards the Nautical Institute Training and Certification Scheme For Key Technical DP Personnel (The DP Vessel Maintainer Course).

Further training and experience and company competency assessment should be provided by the company as per IMCA M117 guidelines and the ISM Code.

The objectives of the ISM Code are to ensure safety of life at sea, prevent human injury or loss of life and avoid damage to the marine environment.

All companies operating and/or owning ships must:

- Provide for safe practices in ship operations and a safe working environment.
- Establish safeguards against all identified risks.
- Continuously improve safety management skills of personnel ashore and onboard ships, including preparing for emergencies related to both safety and environmental protection.
- Comply with all mandatory rules and regulations.
- Ensure that applicable codes, guidelines and standards recommended by IMO, Flag states, classification societies and marine organisations are considered.

Therefore, in regard to DP Engineer training, the ship operator, whether owner or charterer, must ensure that the engineers on DP vessels undertake the required initial training, including shore courses, and also that they are familiar with the equipment installed on their ship, both for normal operations and emergency situations.

The NI does not provide DP training; rather it accredits training institutions to provide DP Vessel Maintainer training. A list of accredited DP Engineer training providers can be found on The NI's website.

5. Scheme Overview

What is a DP Vessel Maintainer?

1. A DP Maintainer is a person onboard a DP vessel that is part of the technical team whose duties include safe DP operation and preventive maintenance of all DP-related systems onboard a DP vessel.
2. They have knowledge of DP components and their location onboard the DP vessel to allow them to communicate with and complete repairs under the direct instruction from the equipment manufacturer.
3. They have the knowledge to stop maintenance before affecting the redundancy of the vessel.
4. They have the knowledge to know when a vessel is safe to conduct DP operations and is compliant with the DP class of the vessel.

Why is the DPVM Training Scheme Necessary?

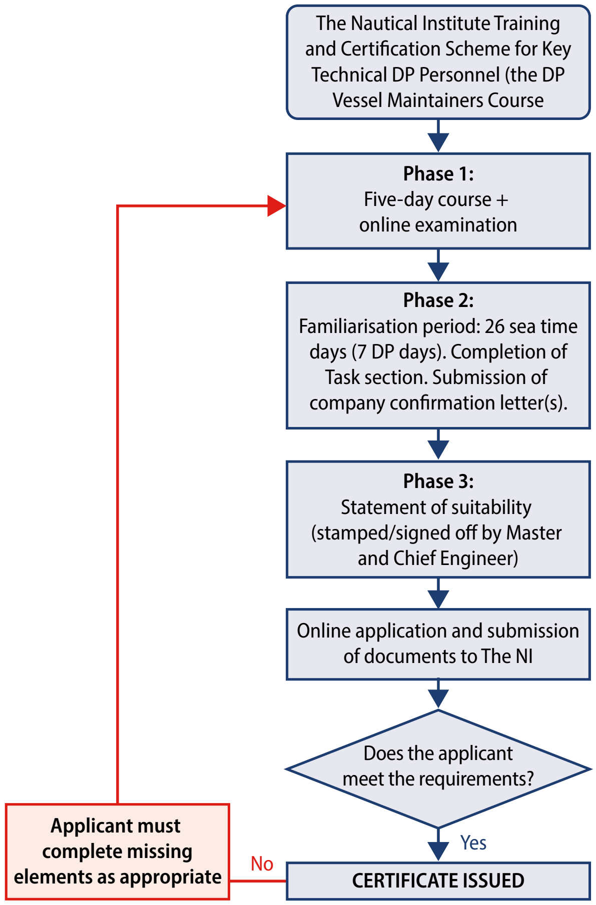
- To ensure a DP Vessel Maintainer has the training to carry out items listed under "What is a DP Vessel Maintainer?"
- To measure the training quality worldwide of all centres.
- To ensure DP Maintainers are familiar with DP theory, concepts and systems and all associated systems onboard their current vessel.
- To ensure that training and experience meet a common minimum standard throughout the DP industry to ensure safe operations.
- Understand all the redundancy aspect of onboard systems to ensure safe DP operations.

6. Training Scheme

A DP Maintainer should be knowledgeable of the type and purpose of documentation associated with DP operations and the DP operations manual that is part of the operator safety management system. They should also be familiar with charterer-specific instructions, equipment manuals, failure modes and effects analysis (FMEAs), capability plots and other DP documents onboard as per IMCA M 109 - A Guide to DP-related documentation for DP vessels.

All training shall be given by properly qualified and suitably experienced personnel. Upon appointment to a vessel operating in DP mode, a DP Vessel Maintainer should be familiarised with the specific equipment fitted on the vessel. Consideration should be given to the nature of the work of the vessel and the importance of the DP system to this work.

The flowchart below illustrates the scheme progression for new entrants, from the start of the training to the issuing of a certificate.



7. Scheme Layout

Part 1: DP Vessel Maintainer Course, Onshore

Part one is a shore-based course provided by an accredited training institute and covers content as listed in the Appendices.

Training school certificate name:

"Nautical Institute Key Technical DP Personnel Training – DP Vessel Maintainers' Part One Theory"

The course is conducted over five days with a minimum of 34 hours which include theory instructions, practical exercises and practical exam and online exam.

This Annex also covers Instructor qualifications, extra simulator equipment required, course duration, practical assessment, and NI online exam.

Part 2: DP Sea Time onboard active DP vessel and Task section of Logbook

Total days: 26 sea time days onboard DP Class Vessel.

Minimum days on DP: 7 days (2 hours operation per day).

Task Sections.

Part 3: Statement of Suitability

Statement of Suitability (To be signed by both the Master and Chief Engineer).

8. Minimum Entry Requirements

Minimum Requirements for entry into the DPVM Scheme shall be as follows:

Following the 2010 Manila amendments to the STCW Convention and Code, The Nautical Institute (The NI) has implemented the following criteria for entry into the DP Vessel Maintainer training scheme: The minimum qualification is set at STCW Regulation III/1 – III /2 – III/3 – III/6 Engine, and Regulation III/6 for ETOs. The Nautical Institute will also accept anyone on a case-by-case basis that holds a technical officer's position on any DP vessel and STCW Regulation III/7.

The training centre theory part and NI online exam for the course may also be attended by relevant shore-based technical staff and DPOs and technical cadets to improve their knowledge. They can be issued a certificate of completion (Theory Only).

To be issued a Key Technical DP Personnel Certificate (The DP Vessel Maintainer' Course Certificate) candidates must be serving as part of the vessel Technical staff, ie Engineer or ETO.

9. Revalidation

A. To revalidate a DPVM Certificate, in addition to 150 days of sea time or equivalent, DPVM needs to :

- i. Pass The NI CPD Revalidation online exam and NI-approved Continuing Professional Development (CPD) Programme.

  OR

  ii. NI DPVM Refresher and Competency Assessment Course- (The Refresher/Revalidation Course may be completed up to six months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, during which the DPO must send in an application into The NI).

B. DPVM with 30 days or more DP sea time may revalidate with the following option:

- NI DP Refresher and Competency Assessment Course.

DPVM with No DP sea time or less than 30 days must complete The NI DPVM Revalidation Course. When revalidating using the Revalidation Course for a second or subsequent time, the DP technical staff must follow the rules as per the standard with respect to sea time requirements.

Table 1 Revalidation matrix	
1 Jan 2024	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of one year of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2025	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of two years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2026	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of three years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2027	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of four years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2028	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2029	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of The NI-approved CPD programme or complete The NI DP Refresher Course. From 1 January 2029, applicants will receive the standard 3-month indemnity letter once they have submitted and paid for their online application.

10. Online Assessment

In order to be awarded a certificate of completion for the DP Vessel Maintainer Course the trainee must pass an online assessment at the training centre. The exam is composed of multiple-choice questions and shall be completed in 1 hour 30 minutes. The online assessment will consist of 40 questions and shall be completed with a pass mark of 70%.

Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. Failing these three initial attempts, the student is required to repeat the DP Vessel Maintainer Course and undertake the assessment again.

On successful completion of the DP Vessel Maintainer Course and online assessment, the trainee Dynamic Positioning Vessel Maintainer will be issued with a Nautical Institute Training and Certification Scheme for Key Technical DP Personnel logbook in which their course, DP sea time, task completion and Statement of Suitability as a DPVM are recorded.

11. Appendix 1 to Training and Certification Scheme For Key Technical DP Personnel (The DP Vessel Maintainer Course) – Training, Accreditation & Requirements

Accreditation is given for the DP Maintainers Course.

A Nautical Institute Training centre that has a B Class simulator and meets the requirement of NI - Training centre model Course DP Vessel Maintainer to support the delivery and assessment of the DP Maintainer course, may apply for accreditation to conduct the DP Maintainer Course.

The attentions of Masters and Chief Engineers are drawn to this statement: the suitability of the officer to undertake full DP Vessel Maintainer duties keeping responsibility onboard a DP vessel.

This is the final assessment of the trainee DP Vessel Maintainer and Masters and Chief Engineers should carefully consider whether they are able to affirm the statements within this section before signing. The Statement of Suitability should be completed at the end of the final period of sea time prior to a certificate application being made.

Time to complete the Training Scheme

In order to avoid deterioration of skills during the training period, all elements of the DP Training Scheme shall be completed within two years..

When applying and submitting documents to The Nautical Institute (The NI), all components of the programme (shore-based courses, DP sea time, task sections, Statement of Suitability form and other elements) must have been completed within the previous two years. In the event that any training phases fall outside of the two-year validity period, the trainee will be required to repeat the expired training phase.

Discharge Book, Certificate of Discharge and Company Confirmation Letter

Trainee DP Vessel Maintainers are required to provide a confirmation or testimonial letter from their shipping companies for all the DP sea time required for the DP Vessel Maintainer. This letter should:

- Be written on original headed paper from the shipping company.
- Be signed and stamped by the Operations Manager or Engineer Superintendent or equivalent. Letters signed by Masters or agency staff are not acceptable.
- Be written and dated only after the DP Vessel Maintainer has completed the DP sea time claimed.
- Confirm the total time the applicant has performed as a trainee DP Vessel Maintainer onboard the vessel(s). The NI reserves the right to ask for further and more detailed information, such as the engine room log, if applicable.

After completing the online application, the applicant shall send the following documents to The NI:

- Copy of the STCW CoC, Letter of Service from Company or NVQ certificate (page with personal details, validity date and CoC number).
- Original DP Vessel Maintainer logbook.
- Copy of passport personal details page.
- Original company confirmation letter/s confirming all DP sea time.
- The signed and dated PDF checklist available on the candidate's account after payment. It is compulsory for the trainee DP Vessel Maintainer to sign the declaration of data contained in the online application.
- Any other supporting documentation.

The NI reserves the right to return the logbook and application to candidates who do not apply online or if anything is found to be incorrect or incomplete in the application or training.

Companies that verify their candidates to ensure requirements have been met before an application is made to The NI tend to be more successful. This also assists the company in the management of their DP personnel and their training and progression.

The process for accreditation by The Nautical Institute

Usually, only centres approved by The Nautical Institute for DPO training will be accredited for this scheme. However, The NI can also consider the approval for DPVM accreditation on a case-by-case basis.

Guidance on the procedures for accreditation is contained in The Nautical Institute Certification and Accreditation standard, Vol 2 (Accreditations).

12. Appendix 2 to Training and Certification Scheme For Key Technical DP Personnel (The DP Vessel Maintainer Course) – Model Course

This document covers the Training Centre section of the Nautical Institute Training and Certification Scheme for Technical DP Personnel (DP Vessel Maintainer Certificate course) and is to be read in conjunction with the Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation) 2024.

The Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation) 2024 includes detail requirement for the accreditation of the Training Centres. Administration, classroom layout, training equipment, student's safety, and simulators.

This document includes extra requirement for instructor and simulator equipment that is specific the DPVM classroom-based training.

Introduction

This NI model course document is to be read in conjunction with:

A. The Nautical Institute Training and Certification Scheme For Key Technical DP Personnel. (The DP Vessel Maintainer Course), named as DPVM in this document.
B. Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation) 2024

Purpose of The NI model courses for DP Vessel Maintainer

The purpose of The NI model courses is to assist NI training institutes and their teaching staff in organising and introducing new training courses, or in enhancing, updating or supplementing existing training material where the quality and effectiveness of the training courses may thereby be improved.

As in all training endeavors, the knowledge, skills, competence and dedication of instructors are the key components in the transfer of knowledge and skills to those being trained through NI standards.

Courses shall be a minimum duration of five days with a minimum of 34 hours including classroom instruction, simulator time and assessments.

This course is Part One of The Nautical Institute Training and Certification Scheme for Key Technical DP Personnel (The DP Vessel Maintainer Course) which comprises the following:

Part One: Nautical Institute Key Technical DP Personnel Training – DP Vessel Maintainer
Part One Theory Course is a shore-based course provided by a Nautical Institute-accredited training institute and covers course contents detailed in this document.

The course is conducted over five days with a minimum of 34 hours which include theory instruction, practical exercises and practical exam and online exam. The course should cover details of the course, its content, instructor qualifications, extra simulator equipment required, course duration and practical exam and online exam.

Part Two: DP sea time onboard an active DP vessel and completing task section of logbook.
Total days: 26 days onboard DP Class vessel.
Minimum days on DP: 7 days (2 hours of operation per day).
Vessel-specific and company-specific training as listed in the DPVM logbook Task sections.

Part Three: Statement of Suitability
To be signed by both the Master and Chief Engineer.

The NI DPVM Logbook covers the onboard training and drills required by the DP Vessel Maintainer. A DP Vessel Maintainer requires a good understanding of onboard DP equipment along with familiarisation of DP integration of other systems onboard, DP Procedures, DP documents and their locations. Effective training in the classroom and onboard should enable key DP technical personnel to respond quickly and appropriately to equipment failures and faults that may result in DP incidents, to identify when the vessel has a loss of redundancy and is required to be moved to a safe drift-off location before reinstating DP equipment to its normal operating state.

Training centres or organisations that have developed training programmes that are compliant with NI DPVM course requirements may apply for accreditation by The Nautical Institute (The NI) for the course. When an organisation and its course are accredited, it will be authorised to issue certificates bearing the logo of The NI and to promote its course as being compliant with the standard of The NI.

Use of The NI DPVM model course

To use the model course effectively, instructors should review the course plan and detailed syllabus, considering the information on the entry standards specified in the course framework. The actual level of knowledge, skills and prior technical education of the trainees should be kept in mind during this review, and any areas within the detailed syllabus that may cause difficulties because of differences between the actual trainee entry level and that assumed by the course designer should be identified. To compensate for such differences, all course material shall be sent to NI for review.

Lesson plans

Training centres are to develop lesson plans based on the detailed teaching syllabus and specifications of simulators. Instructors should pay due attention to the trainees' backgrounds and previous knowledge when adjusting the course content to suit their knowledge and experience and advise of any revision of the course objectives required. The detailed teaching syllabus describes required performances that, together with the exercise scenarios, will be used to deliver the course.

Presentation

The presentation of concepts and methodologies should be repeated in various ways until instructors are satisfied that the trainees have attained each specific learning objective. The syllabus is laid out in learning-objective format and each objective specifies the performance required of the trainees to achieve the intended learning outcomes.

Implementation

For the course to run smoothly and to be effective, considerable attention should be paid to the availability and use of:

- Properly qualified instructors.
- Technical and non-technical support staff.
- Teaching and other spaces.
- Appropriate training equipment and teaching aids.
- Videos and multi-media presentations.
- Textbooks, appropriate technical papers and other relevant written material.
- Minimum Class B simulator approved by The Nautical Institute.
- Extra simulator requirement for DP Vessel Maintainer practical training.
- Nautical Institute database of training materials.

Validation

The guidance contained in this document has been validated by The NI DPTEG on Human Element, Training and Watchkeeping for use by administrations and training providers in developing relevant training programmes for effective implementation of uniform minimum standards for training and certification of seafarers.

Part A: Course Framework

Aim

To give the student the following:

- An understanding of the theoretical and practical operation of DP systems.
- Technical understanding of the component parts of the DP and associated systems.
- An understanding of the limitations of equipment and the effects of equipment failures.
- An understanding of the limitations and the effects of incorrect operation of the systems.
- An understanding of work that can safely be undertaken with and without the help of equipment manufacturers and, more importantly, when to stop before affecting the vessel's capability to perform DP operations or redundancy.
- The ability to find faults in the DP system and its base components.
- An understanding of FMEAs and the philosophy of system redundancy.
- An improved ability to operate the engine room and DP equipment in a safe and competent manner.
- An understanding of MTS vessel design philosophy and MTS fundamentals.
- An understanding of cross connections and their effect on redundancy.
- DP knowledge and vessel/type-specific onboard equipment training.

Scope

Seafarers responsible for designated dynamic positioning duties associated with the equipment's maintenance or use in emergency situations should have completed The NI Training for Key Technical Personnel (DP Vessel Maintainer) course for service on ships subject to dynamic positioning operations.

This course is essentially a course with practical guidance and information and provides training and qualifications for engineers, engine officers and ETO if part of the ships technical team.

The course consists of theory and practical exercises structured around the safe operation of DP ships, DP classes, design of DP installations, propulsion machinery, auxiliary systems and power generation machinery.

Training and Accreditation Standard

Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation) current version

The Process for Accreditation by The Nautical Institute

Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation) current version

Entry standards

Refer to DP Vessel Maintainer Training and Certificate scheme, Accreditation standard.

Course intake limitations

Refer to DP Vessel Maintainer Training and Certificate scheme, Accreditation standard.

Staff requirements & Instructor Qualifications

Course shall be conducted by an NI DP instructor who has also attended The NI DPVM course or NI DP Knowledge for Technical staff Part A.

The course may be delivered by one or two instructors.

The course shall have a suitably-qualified ETO, Chief Engineer or DP Service Engineer to support training. If The NI instructor is an engineer or has good in-depth technical knowledge, then extra support may not be required subject to review by The NI.

Teaching facilities and equipment

Suitable teaching spaces equipped with the relevant facilities should be provided to facilitate the effective delivery of training, which could be through lectures, group exercises and discussions, as appropriate.

Where the use of multi-media and simulation is intended, it should be ensured that appropriate multi-media equipment and simulators are made available.

The following items of equipment are recommended to enable the trainees to undergo practical exercises on a DP simulator that covers section B-V/f* from the STCW Code and the objective of this course:

- Audio-visual equipment and material.
- Whiteboard/interactive whiteboard/flipchart for demonstrations.
- Internet connection.
- Minimum DP Class B Simulator recognised by The Nautical Institute.
- Extra simulator equipment as listed below.
- Requirements of Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation) current version.

Delivery Method

The course will be based on theory and NI B Class simulators and will give the participant an overview of DP operation and the effects of system and component failures. On completion of this course, participants will understand the general arrangements for DP systems and the principles of operation of the equipment. Participants will gain an understanding of the importance of the interaction between the system components and the modes of operation.

The course is set up to allow developing some of the course contents into computer-based training. The student- to-instructor ratio will be a maximum of eight students to one instructor to ensure proper learning.

However, a case may be made for up to 12 students depending on the equipment and extra support staff available.

This course requires the ability to read and interpret ship drawings, typical product specifications, job sheets, procedures, material labels and safety information as provided to operators. Writing is required to the level of completing workplace forms. The course shall be delivered in English.

Teaching aids

- Instructor manual.
- Visual presentations.
- Videos.
- Drawings.
- Samples of sensors.

In addition, DP vessel drawings or other means of demonstration of ship installations of systems for propulsion machinery and auxiliary power generation machinery should be provided.

Note:

1. Other equivalent teaching aids, including multi-media training aids such as videos, CD-ROMs, e-learning materials and computer-based training (CBT) may be used only if approved by the Nautical Institute before being used for training.
2. The NI will provide the following technical support documentation to training schools via The NI website Training Provider logon.
   Training FMEA, vessel drawing, product information. IMCA documents approved for use by Training centre. MTS documents approved for use by Training centre.

Use of Simulators

If using simulator-based training, instructors should ensure that the aims and objective of these sessions are defined within the overall training programme and that tasks are selected to relate as closely as possible to shipboard tasks and practices.

Simulator Equipment Required

The minimum simulator requirement is an NI Class B simulator in an accredited NI training centre. Course contents shall have an assortment of photos of real equipment and DP installations. Photos must cover all parts of a DP system:

i. Controller.
ii. I/O units.
iii. Optical isolators.
iv. Switchboard.
v. Environmental sensors.
vi. Position Reference Systems.

A computer to display different types of serial strings. This may be augmented if a real sensor is available.

Students should preferably be provided with real hardware and associated equipment, either operational or non- operational.

If a training centre does not have some of the simulator equipment or a screen to show I/O and other information on their simulator then on a case-by-case basis the auditor will ensure the training notes cover the required course objectives.

Simulator exercises

- Demonstrate a problem of command signal.
- Demonstrate a problem with the feedback signal.
- Demonstrate a thruster failing to full thrust.
- Demonstrate a reject problem with gyro and wind sensor.
- Demonstrate a slow spread of position reference system, then deselect one position reference system to show how a vessel can have a drive-off with all equipment working correctly.
- Demonstrate a slow spread of position reference sensors until one position reference system is rejected by median test/prediction test.
- Demonstrate the high loads caused if the set point speed is set too high.
- Demonstrate the high load caused when changing heading when the centre of rotation is set away from the centre of the vessel.
- Demonstrate having the bow into high wind and current, then turn the vessel 90 degrees and show high load and loss of position.
- Demonstrate if the DP is unstable.
- Monitor the command and feedback value in mA on the DP operator screen.
- Monitor input serial strings into the DP system on the operator screen if the string is simulated or use a computer programme to generate a serial string.

Safety routines

Safety precautions during DP drills are important during this course and affect the course structure. Trainees should always be protected from danger whilst the course is in progress. Training providers should consider the training spaces, equipment, facilities available and the safety of trainees at all times. During the course, especially during practical drills, trainees should strictly adhere to the safety rules laid down by the training provider.

All the equipment used for practical training should be properly maintained and approved by The Nautical Institute.

Part B: General Outline

General Course Content and Competencies

The general course content and competencies comprises of the following outline:

- General overview of DP.
- The power system.
- The thruster system.
- Control systems and sensors.
- Documentation.
- DP operation and effects on DP system.
- Safe DP operation CAM, ASOG, TAM and TAGOS.
- Lessons learned.
- Manning, training and competency assessment.

Timetable

This NI course has been developed providing a recommended range in duration of 34 hours over five days for lectures, demonstrations, or simulator exercises and NI online assessment and practical assessment. The Training centre is to develop a formal timetable for this model course.

Training centres must develop their own timetable depending on:

- The level of skills of trainees.
- The numbers to be trained.
- The number of instructors.
- Simulator facilities and equipment.
- Normal practices at the training centre.

Course Outline

Review of The Nautical Institute DPVM Training Scheme.

- DP hardware and integration with other ships systems.
- DP software, alarms and position control.
- Power system and thruster systems.
- Planned maintenance of DP and associated system and when to call service technician. Documentation, DP equipment, Class, IMCA and MTS.
- Manning, training and competency assessment.
- Safe DP operations.
- Essential non-DP Systems – safety systems.
- Future trends including automation and Integrated bridge management systems.
- Simulator exercises.

The course comprises lectures, demonstrations, and simulation exercises. The outline below identifies the main areas of the course.

A learning objective format is used in the detailed teaching syllabus given in Part C; the outline below is a summary of the course material. The numbering system used below reflects that of the detailed teaching syllabus.

Part C: Detailed Outline

Part C correlates the knowledge, understanding and proficiencies defined in the STCW Code and IMCA 117, with the specific learning outcomes that the trainees should achieve. Each specific outcome is presented as a topic or sub-topic as a learning objective reflecting the knowledge, understanding and proficiency in section B- V/f* from the STCW Code.

Learning objectives

The following detailed course outline has been developed in learning objectives

1	**Course contents and Competencies in Detail to be part of NI - Training centre model course DP Vessel Maintainer**
1.1	The following list of competencies are in detail to ensure that all training centres cover the same contents. Many of the items are just one statement on a PowerPoint. The numbering is based on the current number for DP Knowledge for Technical staff. **The Nautical Institute will supply Training centres with an FMEA study and FMEA proving trial, IMCA, MTS and OCIMF documents to base some of their training on.**
2	**Brief history of DP system development**
2.1	Development of DP systems and what is needed for offshore drilling.
2.2	Brief discussion on the way DP is used.
3	**Reasons why DP is used extensively; Client requirements; Safety etc.**
3.1	DP can be used when water is too deep for anchors.
3.2	Removes the need to make fast to offshore installation and improves the safety for crews.
3.3	Quick deployment at a new location of any type of vessel.
3.4	Increasingly difficult to manually operate multi-thruster vessels.
3.5	Provides a stable platform for crane ops, gangway ops, ROV ops etc.
4	**Types of DP Vessels**
4.1	Course to briefly discuss the type of DP vessels and their uses. OSV, drilling units, construction vessels, dive vessels, pipe lay vessels, wind farm vessel, passenger vessels. Describe type of thrusters fitted.
5	**Theory of DP control; Explanation of how the system positions the vessel; Heading; Feedback; Wind; Modelling, Kalman filter, controllers and DP current etc.**
5.1	To be able to discuss briefly the main elements of a DP system, DP computer/controller, thruster and propulsion, power systems, position reference and environmental sensors.
5.2	Describe why the DP system requires a wind input.
5.3	Describe why the DP system requires a heading input.
5.4	Describe why the DP system requires an input for roll, pitch and possibly heave.
5.5	Describe full joystick mode.
5.6	Describe joystick auto heading mode.
5.7	Describe two- axis control.
5.8	Describe full three- axis control.
5.9	Describe the difference between DP joystick, remote joystick and independent joystick.
5.10	Describe modelling.
5.11	Describe the function of Kalman filters.
5.12	Describe how DP current is calculated.
6	**DP equipment classes as defined in IMO guidelines and classification society rules.**
6.1	Describe Class 1, Class 2 and Class 3 DP vessels.
6.2	Describe enhanced notation.

6.3	Review DP system generic one line drawing for Class 1, 2 and 3 vessels.
6.4	Describe redundancy.
6.5	Describe worst case failure (WCF) in terms of redundancy.
6.6	Describe loss of redundancy effecting class of the vessel.
6.7	Describe the overuse of power and the effect on WCF redundancy.
6.8	Describe what class of vessel is best suited for each industry mission.
6..9	Describe consequence analysis alarm and requirement for the use during class 2 and 3 operation.
6.10	Describe what would trigger a consequence analysis alarm.
7	**Typical elements of a generic DP system**
7.1	Describe the function of controllers.
7.2	Describe the function serial input.
7.3	Describe the function analogue and digital input and output.
7.4	Describe the function network system.
7.5	Describe the function power supplies.
8	**The power System**
8.1	All components and systems necessary to supply the DP system with power. The power system includes:
9	**Fuel systems**
9.1	Describe a generic redundant fuel system.
9.2	Describe potential failures and associated impact on DP class.
9.3	Describe how contaminated fuel can affect redundancy.
9.4	Describe how the cross connection of a fuel system will defeat redundancy.
9.5	Describe the effects of inadvertent operation of fuel tank quick closing valves.
10	**Cooling systems, fresh and sea water**
10.1	Describe a generic redundant cooling system for fresh and sea water.
10.2	Describe the impact of system failures on DP class.
10.3	Describe cooling pipework separation required for Class 3 redundancy.
10.4	Describe the requirement to keep plate coolers and sea strainers clean and the effects of overheating. Overheating will lead to a reduction of power available and effect on redundancy.
10.5	Describe the use of two sea suction valves in a system.
10.6	Describe the effect of weed and jelly fish blocking sea suctions.
10.7	Describe the effect of ballast pump if connected to the same sea water system suction as the cooling system.
10.8	Describe the use of antifouling system requirements in sea water systems.
11	**Compressed air system**
11.1	Describe the layout of a typical redundant compressed air system.
11.2	Describe the possible effects of compressed air failure on DP operations.

11.3	Describe precautions with sharing ship's compressed air with on-deck industry mission equipment
12	**Ventilation system**
12.1	Describe layout of a redundant engine room ventilation system.
12.2	Describe the possible effects of inadvertent closure of ventilation dampers during DP operation.
12.3	Describe possible effects of gas detection and fire detection equipment could have on ventilation systems.
13	**HVAC**
13.1	Describe layout of HVAC systems for redundant equipment operation.
13.2	Describe the effect of loss of HVAC to engine rooms, equipment rooms, switchboard rooms, control rooms and bridge could have on the DP system.
14	**Lubrication system**
14.1	Describe a typical layout of a redundant lubrication system for an engine.
14.2	Describe a typical layout of a redundant lubrication system for propulsion system.
14.3	Describe the importance of a pre-lubrication system on a standby generator engine to allow quick start up.
14.4	Describe the consequence of loss of lubrication system for thrusters, CPPs and gearboxes.
14.5	Describe the importance of oil sampling and testing as part of the maintenance routines.
14.6	**Generators and main engines**
14.7	Main engines
14.8	Describe a typical generation plant layout and redundant power generation arrangements. Both full diesel-electric and direct drive main thrusters.
15	**Main switchboard**
15.1	Discuss the generated voltage options and limitations with regard to main switchboard short circuit design.
15.2	Describe a typical layout and functionality of a redundant switchboard for a diesel electric power plant.
15.3	Describe interlocks on main switchboards.
15.4	Describe potential failures and the impact on DP class.
15.5	Describe switchboard protection systems.
15.6	Describe the term "designed to test".
15.7	Describe problem with main switchboard, under and over voltage, under and over cycles, short circuits.
15.8	Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip.
15.9	Describe why you would have thermal imaging conducted on switchboards on DP vessels.
15.10	Describe the function of automatic change-over systems.
15.11	Discuss the problems with connecting mission equipment to a redundant main switchboard.
15.12	Discuss DC main switchboard concepts.
15.13	Discuss monitoring equipment on main switchboard.
15.14	Discuss energy storage system. Connections with switchboards. Max power usage, Battery safety.

16	**Generators**
16.1	Describe typical arrangements on a DP2 vessel.
16.2	Describe spinning reserve and power available.
16.3	Discuss the arrangements required to ensure redundancy remains in place and what factors influence redundancy.
16.4	Describe the use of standby generators and at what load should generator auto-start.
16.5	Describe the reason to disable auto-stop on low load when on DP.
16.6	Describe how the use of more than 45% utilisation can affect redundancy.
16.7	Describe how the electrical power available will affect thruster output.
16.8	Describe how the electrical power available will affect the vessel capability plot.
16.9	Describe load shedding.
16.10	Be able to discuss a one-line electrical drawing.
16.11	Describe how generator monitoring systems are different from power management systems.
16.12	Describe AVR control base principal and the result of AVR failure.
16.13	Describe the typical plant layout for a diesel-electric DP vessel, compare the layout to a conventional vessel with twin CP propellers. Discuss the advantages and disadvantages of both systems.
16.14	Describe engine shutdown and protection systems.
17	**Bus-tie requirements of IMO/class/FMEA**
17.1	Describe open and closed bus tie as per IMO 645/IMO 1580
17.2	Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip.
17.3	Describe how open bus tie can ensure a fault on one switchboard will not affect another switchboard.
17.4	Describe with an example how the main bus-tie breaker and all other breakers are set up as per FMEA.
17.5	Describe the benefit of closed bus tie systems.
17.6	Explain that after WCF on a closed bus tie system the bus tie is to remain open if trip during WCF until fault is found.
17.7	Describe breaker selective study, fault ride-through and explain that the main bus tie is to open before the generator breakers.
17.8	Discuss new requirements for testing of bus tie breakers.
18	**Electrical systems and cabling communications**
18.1	Describe the function of an Uninterrupted Power Supply (UPS).
18.2	Describe a typical UPS arrangement for DP2 and DP3 operations.
18.3	Describe how to operate the bypass of a UPS.
18.4	Describe test requirements for a UPS.
18.5	Describe typical alarms from a UPS.
18.6	Describe maintenance and life of UPS batteries.
19	**AC supplies**
19.1	Identify on a one-line drawing the redundancy set-up and ensure there are no cross-connections.

19.2	Identify what is connected to the AC circuits and possible loads.
19.3	Describe a typical one-line diagram for distribution and supply of AC circuits on a DP vessel.
19.4	Identify what is connected to the AC circuits and which are critical to DP operations.
19.5	Explain that all sub tie breakers need to stay open regardless of whether the main tie breaker is open or closed.
19.6	Discuss circuit protection and fuses.
19.7	Discuss testing of auto-standby circuits for pumps, steering etc.
20	**DC supplies**
20.1	Describe a typical 24V DC redundant supply one-line diagram.
20.2	Describe the various arrangements for backup supplies to engine control systems and switchboards.
20.3	Describe the risk of cross connections in 24V supplies.
20.4	Describe the problem of earth faults on two redundant systems and the use of DC/DC isolated Supplies.
20.5	Discuss the importance of clearing DC earth faults promptly for safe operation.
20.6	Describe procedures for testing and maintenance of battery backup systems.
20.7	Describe what could happen if there is a loss of charging power.
20.8	Describe typical alarms from 24V DC systems.
21	**Digital interferance**
21.1	Describe a typical digital interface arrangement to a DP controller.
21.2	Describe why a digital input is required by a DP controller and what system inputs normally use this type of input.
21.3	Describe how a digital signal may be transmitted over a network from a remote I/O station.
21.4	Discuss fail-safe modes for digital signals and networks.
21.5	Describe the loss of redundancy upon failure of one multi-channel interface unit (I/O) with input connected signal from two different redundancy groups.
21.6	Discuss testing of digital signals.
22	**Analogue interface**
22.1	Describe the different analogue signals associated with DP control systems and their use.
22.2	Describe the benefit of 4-20mA signals for control and feedback of thrusters and main drives.
22.3	Discuss testing of analogue signals.
23	**Serial interface**
23.1	Describe the concept of serial data transmission and its use in DP control systems.
23.2	Describe the various types of serial connections, RS232 & RS422.
23.3	Describe the different types of NMEA protocol sentence formats and how to read them.
23.4	Describe how to monitor NMEA string using the DP display, laptop or meter.
23.5	Describe a simple check for NMEA string data errors.
23.6	Describe the benefit of using RS422 serial connections over RS232.
23.7	Discuss serial isolators and serial signal convertors.

23.8	Discuss cable requirements for interconnection of serial units.
23.9	Discuss/show examples on different NMEA strings (such as GNSS, wind, gyro)
23.10	Describe the purpose and use of optical isolator units
24	**Network systems**
24.1	Network layout for DP system.
24.2	Network storm.
24.3	Network testing.
25	**Power management system custom systems and IMO DP equipment class 2/3 requirements**
25.1	Maintaining continuity of electrical power under all defined load and failure conditions.
25.2	General system functions
25.3	Describe typical power management systems for a DP vessel.
25.4	Describe why a breaker selective study is required and its importance.
25.5	Describe the difference between DP power limiting and generator power management.
25.6	Describe the reason to disable load-dependent stop while in DP mode.
25.7	Describe a generator monitoring system and the important information it supplies
26	**Extra loads on switchboard with different operation, drilling, ROV etc**
26.1	Describe the need for a new load balance study when connecting extra equipment, such as an ROV.
26.2	Describe the possible reduced power to thrusters.
26.3	Describe the possible effect on the vessels capability plot.
26.4	Describe the problem of supply from only one switchboard and the loss of the switchboard.
26.5	Describe how, when a piece of equipment fails, the fault transfers to the switchboard that caused a blackout.
26.6	Explain what a load balance study is.
26.7	Explain what the term "designed to test" means.
27.8	Describe auto blackout recovery.
26.9	Describe load-dependent start and explain that the vessel could have passed the WCF load before the extra generator starts.
26.10	Discuss why there may be different parameters in the PMS for DP operation and sea mode.
26.11	Discuss system failures that can affect the operation of the PMS and the backup operating modes that are available.
26.12	Discuss advanced generator supervisory systems and their independent operation from the PMS.
26.13	Describe the extra redundancy required for working "drift-on".
26.14	Explain the need for more spinning reserve when working drift-on.
27	**Cabling**
27.1	Describe the need to keep cables away from heat, exhaust flow.
27.2	Describe the physical cable routeing for Class 3 vessels as per IMO 645/1580 and classification society requirements.

27.3	Describe the importance of separation between power cables and control and data cables.
27.4	Discuss use of separate cable trays and physical routeing to maintain redundancy.
27.5	Describe the use and grounding arrangements for screened signal cables.
27.6	Describe the problem of replacing cables with the wrong type, not twist pairs.
27.7	Describe the problem of network cable near radio transmitters.
27.8	Discuss the use of fibre-optic cable and its advantages over conventional types.
28	**The thruster system**
28.1	Describe the components and systems necessary to supply the DP system with thrust force and direction. These include azimuth thrusters, tunnel thrusters, propellers and other systems.
29	**Thruster control concepts**
29.1	Describe how a DP system typically is connected to a thruster control system, including normal control and backup control (on thruster control system).
29.2	Describe how emergency operation of thrusters will affect the DP control of the thrusters.
30	**Thruster redundancy**
30.1	Describe thruster supply change over.
30.2	Describe how changing over a thruster that has failed could transfer the fault to a second redundancy group.
31	**Thruster failure modes**
31.1	Describe "Fail as set".
31.2	Describe "Fail to zero".
31.3	Describe "Fail to full".
31.4	Describe why you would lose the ready signal.
31.5	Explain that emergency stops will still work when vessel is in DP control.
31.6	Describe the effect on the DP system of a failed thruster.
31.7	Describe the counterbalance effect of other thrusters when a thruster fails and the vessel is left in full auto DP mode.
31.8	Describe thruster control by IP over ethernet and trouble shooting.
32	**Azimuth thrusters, tunnel thrusters, propellers and other systems**
32.1	Describe standard fixed pitch propeller advantages and disadvantages.
32.2	Describe standard CPP advantages and disadvantages.
32.3	Describe tunnel thruster advantages and disadvantages.
32.4	Describe drop down and fixed in position azimuth thrusters.
32.5	Describe fixed pitch thrusters' advantages and disadvantages.
32.6	Describe CPP azimuthing thruster advantages and disadvantages.
32.7	Describe flap/Becker rudders and their advantages and disadvantages.
32.8	Describe fishtail rudders and their advantages and disadvantages.
32.9	Describe propeller nozzles and their advantages and disadvantages.
32.10	Describe variable frequency drives and their advantages and disadvantages.

32.11	Describe direct drive and its advantages and disadvantages.
32.12	Describe constant speed RPM motors for CPP thrusters and advantages and disadvantages.
33	**Thruster control concepts**
33.1	The following objectives (33.2 – 33.10) address the components and systems necessary to supply the DP system with thrust force and direction.
33.2	Describe the thruster ready signal and what parameters are required for it to be present.
33.3	Describe auto start-up of thrusters and auto selection into the DP system if a full blackout auto recovery system is fitted. Recovery system is programmed into the power management system.
33.4	Describe command and feedback signals (mA and V) and which one is better.
33.5	Describe emergency stop on thruster.
33.6	Describe wire break monitoring.
33.7	Describe remote I/O concepts used in thruster control network or can bus systems.
33.8	Describe backup redundancy on control systems.
33.9	Describe typical alarms on thruster controls and DP systems.
33.10	Describe testing of thruster signals for DP trials.
34	**Thruster redundancy**
34.1	Describe typical thruster main power supply systems for redundancy.
34.2	Describe typical backup hydraulic pumps, steering motors, cooling pumps, filters, cooling systems and fans fitted to rudder and thruster systems.
35	**Thruster failure modes**
35.1	Describe what would indicate the following on a DP system – fail as set, fail to zero, fail to full, loss of ready signal.
35.2	Describe a hydraulic problem with CPP thrusters.
35.3	Explain that a thruster could always have a mechanical problem.
36	**Control systems and sensors**
36.1	The following objectives (37.1 – 39.6) address the control components and systems, hardware and software necessary to dynamically position the vessel.
37	**DP operator workstation**
37.1	Describe a typical operator workstation and the various hardware components.
37.2	Describe the management for change for software.
37.3	Explain that the DP system must be full tested to check operation after software upgrade.
37.4	Describe typical maintenance and testing that should be carried out on a workstation.
37.5	Describe a typical procedure for total shut down and re-starting of a DP control system.
37.6	Discuss how to download log files for analysis.
38	**Control processor(s)**
38.1	Describe the function of the control processor in the DP control system.
38.2	Describe the redundant design incorporated into the control system.
38.3	Describe the redundant interconnections between the control processor and the I/O units.

38.4	Describe how a failure on a DP controller is typically handled to maintain position-keeping.
38.5	Explain that some DP systems use a PLC as part of the control system.
39	**Independent joystick system (IJS)**
39.1	Independent joystick system (IJS)
39.2	Describe the difference between IJS and portable/wing joysticks.
39.3	Describe the class requirement for IJS.
39.4	Explain that on some older vessel the IJS can use the same controllers.
39.5	Describe how a IJS is powered.
39.6	Describe which DP sensors and references are also typically used for the IJS.
40	**Peripherals**
41	**Printer**
41.1	Describe the DP printer and the need for it to be online during DP operations.
41.2	Discuss DP data loggers as independent to the DP system, can replace as long as you can print alarms.
41.3	Discuss how to download log files for analysis.
42	**Changeover switch, manual controls/DP/joystick**
42.1	Describe the design of a typical changeover switch as a multi-gang switch on a single operating spindle and are not electrically connected.
42.2	Explain that a common changeover switch removes the ready signal from the thruster to DP System.
42.3	Describe the changeover switch in a network thruster control system.
42.4	Describe wire break monitoring on emergency change over DP to manual and on a DP to manual network control system.
42.5	Describe wire break monitoring on emergency change over DP to manual and on a DP to manual network control system.
42.6	Explain that the emergency stop and backup/emergency controls will still work with changeover switch set to manual or DP mode or IJS mode.
43	**DP software**
43.1	Describe the six degrees of freedom and which of these the DP system controls.
43.2	Describe hydrodynamic model.
43.3	Describe aeronautical model.
43.4	Describe DP mathematical model and PID control loop.
43.5	Describe DP current.
43.6	Describe error affecting the DP current.
43.7	Explain why the mathematical model can become unstable.
43.8	Describe auto swap on the operator station and controllers and class rules about swapping.
43.9	Describe DP modes.
43.10	Describe backup copy and reloading program, following manufacturers' instructions.

44	**Alarms**
44.1	Describe the need to set alarms to warn at an early stage.
44.2	Explain that the DPO and engineer must understand what the alarm is and what caused it.
44.3	Describe how to find information about an alarm in vessel documents and on-screen help.
45	**Position reference systems: hardware, software and sensors**
45.1	Explain why position reference systems are used by the DP program.
45.2	Describe the minimum number of position reference systems required to meet Class 1, 2 and 3.
45.3	Describe position reference system voting.
45.4	Describe the difference between "fixed" and "mobile" relative position reference systems.
45.5	Describe what happens when all position reference systems are lost from the DP system.
46	**DGPA/DGNSS**
46.1	Describe principle of GNSS systems.
46.2	Describe DGNSS and the use of correction to improve the quality of a position fix.
46.3	Describe the different ways DGNSS corrections are received.
46.4	Describe the disadvantages of the DGNSS system.
46.5	Describe the advantages of the DGNSS system.
46.6	Describe the use of INS to improve the reliability of position.
46.7	Describe how to identify an antenna problem.
46.8	Describe the blocking of correction signal.
46.9	Describe the azimuth and elevation of a corrections satellite.
46.10	Describe failure modes.
46.11	Describe maintenance and logical fault-finding.
46.12	Describe jamming and spoofing of DGNSS systems.
47	**Acoustic**
47.1	Describe principle of an acoustic system.
47.2	Explain why the speed of sound through the water is required.
47.3	Describe its advantages.
47.4	Describe its disadvantages.
47.5	Describe its failure modes.
47.6	Describe its maintenance and logical fault finding.
47.7	Discuss transponder types and uses, charging of transponders.
48	**Taut wire**
48.1	Describe the principle of a taut wire system.
48.2	Describe its advantages.
48.3	Describe its disadvantages.
48.4	Describe its failure modes.
48.5	Describe its maintenance and logical fault finding.

49	**Laser - system**
49.1	Describe the principle of a CyScan system.
49.2	Describe its advantages.
49.3	Describe its disadvantages.
49.4	Describe its failure modes.
49.5	Describe its maintenance and logical fault finding.
49.6	Describe the different types of laser targets, use and maintenance.
49.7	Describe CyScan AS targets.
49.8	Describe SceneScan targetless laser system.
50	**Microwave – systems, short- and long-range**
50.1	Describe the principle of a RadaScan, Radius, Artemis system.
50.2	Describe the positioning of interrogator units.
50.3	Describe the advantages of microwave systems.
50.4	Describe the disadvantages of microwave systems.
50.5	Describe their failure modes.
50.6	Describe their maintenance and logical fault finding.
50.7	Describe their transponders and battery maintenance requirements.
51	**Inertial navigation systems**
51.1	Inertial navigation systems
51.2	Describe their advantages.
51.3	Describe their disadvantages.
51.4	Describe how INS is used with DGNSS and hydro acoustic systems.
51.5	Describe their failure modes.
51.6	Describe their maintenance and logical fault finding
52	**DP sensor systems**
53	**Gyro**
53.1	Describe the principle of a standard gyro compass.
53.2	Describe the principle of a fibre optic gyro compass.
53.3	Describe its failure modes.
53.4	Describe why a gyro might need to be set to manual speed and latitude.
53.5	Describe its maintenance and logical fault finding.
54	**Environment sensors - MRU/VRU**
54.1	Describe the principle of a VRS/VRU.
54.2	Describe why a DP system needs an MRU/VRS input.
54.3	Describe its failure modes.
54.4	Describe the maintenance logical fault finding and calibration required.
54.5	Explain that some MRU/VRS have internal batteries.

55	**Environment sensors - wind sensor**
55.1	Describe the principle of propeller and ultrasonic wind sensors.
55.2	Describe wind feed forward.
55.3	Describe the effect on DP from wind sensor outputting too high a speed and its effect on model.
55.4	Describe the effect on DP from wind senor outputting too low a speed and its effects on DP model.
55.5	Describe the advantages and disadvantages of sensor types.
55.6	Describe maintenance and logical fault finding.
55.7	Describe simple checks ie flags or obstructions.
55.8	Describe problems arising from poor positioning of wind sensors.
56	**Documentation**
57	**DP manual**
57.1	Explain that every DP vessel must have a DP Manual that outlines DP operations, company DP policy, onboard documents, training and vessel hardware. Some classification societies require the DP manual to be class reviewed.
58	**FMEA**
58.1	Explain what FMEA stands for.
58.2	Explain why an FMEA is required and the legislation associated with FMEA.
58.3	Describe what is contained in the two main section of an FMEA.
58.4	Describe the content of the vessel study.
58.5	Describe the process of developing an FMEA and the international guidelines that are recommended.
58.6	Describe the overall contents of the proving trials section.
58.7	Describe the meanings of A, B and C findings.
58.8	Describe the requirement for FMEA to be class-approved.
58.9	Describe what WCFDI is and why is it important.
58.10	Describe how to conduct FMEA trials safely.
58.11	Explain why a copy of the FMEA must be in the engine room and control room.
58.12	Discuss an actual Vessel FMEA to illustrate the process of redundant system review.
58.13	Describe actions to take if errors are found in an FMEA.
58.14	Describe the use of FMEA functional description and block diagrams for fault finding and tracing of faults.
59	**DP annual trials**
59.1	Annual trials as per IMO 1580 and IMCA M 190.
59.2	Explain why CPP and thruster wire breaks need to be tested every year.
59.3	Explain that the redundancy group is to be tested each year.
60	**Capability plots**
60.1	Explain what a capability plot is.
60.2	Describe the capability plot for WCF.

60.3	Describe the difference between a capability plot and a footprint plot.
60.4	Explain why a footprint plot cannot be used to check a capability plot.
60.5	Describe the errors that can occur within capability plots.
60.6	Explain how to use max thruster limit of 45% utilisation to safeguard against error in capability plots.
60.7	Describe an online capability plot.
60.8	Explain why reducing the number of generators and power available can affect the capability plot.
61	**Management of Change Procedures**
61.1	Explain what is meant by management of change.
61.2	Explain why management of change is important.
61.3	Describe what management of change is required for changes of hardware, software, FMEA.
62	**System and equipment manuals**
62.1	Discuss the importance of having a full set operating and maintenance manuals for all DP related systems.
62.2	Discuss the importance of having a full set of up to date 'as-built' technical drawings for the vessel.
62.3	Discuss the use and development of bridge and engine room DP checklists.
63	**Hazards**
63.1	Explain the importance of not carrying out unauthorised maintenance during any DP operation and permit to work.
63.2	Describe managing risk during reinstatement of equipment.
64	**Incident reporting - IMCA and MTS schemes**
64.1	Discuss incident reporting forms for IMCA and MTS.
64.2	Discuss recent and relevant incident reports.
65	**Planned maintenance system**
65.1	Discuss the importance of an effective planned preventative maintenance system for all machinery and equipment related to DP.
65.2	Discuss the importance of maintaining good record keeping and equipment histories.
65.3	Discuss the importance of record keeping of service reports and technical bulletins relating to the DP equipment.
65.4	Describe the process and responsibilities of planning maintenance activities that may affect DP operations.
65.5	Discuss the requirements to carry critical spares for all DP equipment.
66	**Documentation**
66.1	**IMO Documents**
66.1.1	Describe IMO 645 and IMO 1580.
66.1.2	Describe IMO 738 and its links to IMCA 117.
66.2	**OCIMF - Oil Companies International Marine Forum**
66.2.1	DP Failure Mode Effects Analysis Assurance Framework Risk Based Guidance.
67	**Use of IMO 645/1580 by Class, IMCA and MTS**
67.1	Discuss class use of IMO 645/1580 and IMCA/MTS documents to formulate class rules.

68	MTS Documents available and what they contain
68.1	**MTS Design Philosophy**
68.1.1	Offshore Tech Guidance DP-classed vessels with closed bus-tie(s).
68.1.2	DP Vessel Design Philosophy Guidance Part 1.
68.1.3	DP Vessel Design Philosophy Guidance Part 2.
68.2	**MTS DP Operation Guidance**
68.2.1	DP Guidance Part 2, Appendix 3 Logistics.
68.2.3	DP Guidelines on Testing of DP Systems.
69.2.4	DP Tech Committee DP Operations Guidance Part 1.
68.3	**MTS tech ops**
68.3.1	Techop annual DP trials and gap analysis.
68.3.2	Techop FMEA gap analysis.
68.3.3	Techop FMEA testing.
68.3.4	Cross connections.
68.3.5	All other tech ops.
69	**IMCA documents available and what they contain**
69.1	IMCA M103 - The design & operation of DP vessels.
69.2	IMCA M109 – DP-related documentation for DP vessels.
69.3	IMCA M117 – Code of practice for the training & experience of key DP personnel, August 2023.
69.4	IMCA M125 - Safety interface document for a DP vessel working near an offshore platform.
69.5	IMCA M140 - Specification for DP capability plots.
69.6	IMCA M163 - Guidelines for quality assurance & quality control of software.
69.7	IMCA M166 - Guidance on failure modes and effects analysis (FMEA).
69.8	IMCA M182 - MSF International Guidelines for the Safe Operation of DP OSV.
69.8	IMCA M190 - Guidance for developing and conducting DP annual trials programmes.
69.10	IMCA M206 - A guide to DP electrical power and control systems.
69.11	IMCA M220 - Guidance on Operational Activity Planning.
69.12	IMCA M244 - Guidance on vessel USBL systems for use in offshore survey, positioning and DP Operations.
69.13	IMCA M247 - Identify DP system components and their failure modes.
69.14	IMCA M252 - Guidance on position reference systems and sensors for DP operations.
70	**Manning, training and DP emergency drills**
70.1	Describe engine room manning and watchkeeping principles for DP operations.
70.2	Describe requirements for good communication between bridge and engine room at all times.
70.3	Describe the use of checklists and the need to promptly report to bridge any changes in operational status.
70.4	Describe the need to keep the Chief Engineer updated with any operational problems.

70.5	Describe the operation of the status alert system.
70.6	Explain the requirement for comprehensive engine room standing orders.
70.7	Explain the requirement for a comprehensive handover during change of watchkeepers.
70.8	Describe the planning of onboard drills, real and desktop.
70.9	Describe the use of 'mobilisation' and 'start of project' DP trials to ensure system operational readiness.
70.10	Describe the development of standard engine room DP procedures for vessel.
70.11	Explain the need for performing DP drills and their different types.
70.12	Describe how to conduct a Partial blackout drill.
70.13	Describe how to conduct a full blackout drill.
70.14	Describe how to conduct a drill for a broken fuel line.
70.15	Describe how to conduct a drill for a broken cooling pipe.
70.16	Describe how to conduct a fire drill when on DP.
71	**DP operation and effects on DP system**
72	**ASOG – principle, layout and use of activity-specific operational guidelines**
72.1	Describe IMCA 220 and MTS Tech Ops documents outline of ASOG in detail.
72.2	Describe the ASOG list of how the vessel equipment is set up for the current industry mission.
72.3	Explain that ASOG should match the FMEA.
72.4	Explain that ASOG will state what action to take after a failure.
72.5	Explain that ASOG needs to be approved by charterer, shore management and vessel.
72.6	Describe how the ASOG can be used as a decision-making tool after a failure.
72.7	Describe how the ASOG is used for the safe set-up of DP vessel.
72.8	Explain that the ASOG is the bridging document between the vessel and charterer and how the DPO must have their vessel set-up and operational limits.
72.9	Describe the alignment of alert light system and ASOG.
72.10	Describe how the ASOG/CAM is used to reduce risk.
72.11	Explain that the CAMO must match class-approved FMEA.
72.12	Describe the use of 'status light' system on DP vessels.
72.13	Explain that the ASOG/CAMO is a bridge document between vessel documentation and charterer working limits and equipment set-up requirements.
73	**CAMO – principle and layout of critical activity mode of operation**
73.1	Explain that IMCA 220 and MTS Tech Ops documents outline CAMO in detail.
73.2	Explain that CAMO mode set is set up as redundancy mode of operation.
73.3	Describe how the CAMO must match the vessel FMEA.
74	**TAM – principle and layout of task-appropriate mode**
74.1	Describe IMCA 220 and MTS Tech Ops documents outline TAM in detail.
74.2	Explain that TAM requirement could be less than required by the FMEA and after a failure the vessel could have a loss of position.

74.3	Explain that TAM requirement could be less than required by the FMEA and after a failure the vessel could have a loss of position.
75	**TAGOS – principle and layout of thruster and generator operating strategy**
75.1	Describe how the TAGOS can be used to list what combination of generators can be online, setting of all tie breakers and maximum percentage of load used.
75.2	Describe the TAGOS arrangements.
76	**Limitations of different type of DP operations**
76.1	Explain that the mode of operation will depend on the modes supplied with DP system.
76.2	Explain why a DP vessel cannot be used for anchor handling unless a tow winch tension meter is connected to the DP and describe the problem if the tension meter fails.
77	**SIMOPS**
77.1	Describe limitations and extra redundancy required when vessel is in close proximity and experiences drift-on.
77.2	Explain that extra redundancy and generators may be requested by DPO in a high-risk drift-on.
77.3	Explain that at times the main watchkeeping engineer might need to stay in the control room.
77.4	Describe how a vessel can be affected by thruster wash from other vessels.
77.5	Describe how working in close proximity to other vessels might limit the options for manoeuvring the vessel in event of a failure.
77.6	Operating in open water
77.7	Describe how in open water the vessel (ROV/Bell) might be "drift-on" to a subsea asset.
77.8	Describe which position reference system will not work in open water.
77.9	Possible effects of subsea operation on DP vessels.
77.10	Describe the effect of underwater current on drilling risers, Lars, tether and of the ROV leading force on DP.
77.11	Describe the risks of launch and recovery operations.
77.12	Describe the danger of tether becoming entangled in thrusters.
78	**Possible effects of remote access**
78.1	Describe using remote diagnostics and the danger of use during DP.
78.2	Describe the potential damage of cross connecting a network system and cyber attack.
79	**Lessons learned**
79.1	Describe common causes of DP incidents, based on past incident case studies.
79.2	Review IMCA DP incident flowcharts
79.3	Review various published Incident reports (IMCA, MTS, US Coastguard)
80	**Information required when reporting system problems**
80.1	Describe what information is required for remote diagnostics, where to find it and how to communicate. it
80.2	Describe common methods of copying system log files from the operator station computer for fault analysis by the equipment maker.
80.3	Describe the use of screen shots and photos of the equipment to aid fault-finding, supported by copies of the alarm printouts of both DP and machinery alarms taken when the fault occurred.

80.4	Discuss the importance of maintaining records of correspondence of any fault with the equipment maker's service department and including all relevant company technical and operations departments in the correspondence.
80.5	Discuss the trend in remote access via satellite link of some equipment makers. Highlight the security risks of this type of arrangement.

Part D: Instructor Manual

The instructor manual and its guidance notes provide a summary of the topics that are to be presented. The manual provides information on teaching methodology and its organisation, along with the areas that are considered appropriate and important to achieve the relevant learning outcomes. Instructors should prepare relevant lesson plans for the delivery of each topic of the course, specifying the teaching strategy and method to be used and describe the learning activities of the trainees.

Course notes and resources

The course notes, PowerPoint and extra technical information can be supplied in paper-based or electronic formats.

Student takeaway

The Nautical Institute recommends the DP Operator's Handbook eBook (latest version) to be issue to each student, along with training centre course training notes approved by The NI.

Part E: Evaluation and Assessment

The effectiveness of any evaluation depends to a great extent on the precision of the description of what is to be evaluated. The detailed teaching syllabus is thus designed to assist the instructors, with descriptive verbs, mostly taken from the widely-used Bloom's Taxonomy. Evaluation/ Assessment is a way of finding out if learning has taken place. It enables the assessor (instructor), to ascertain if the trainees have gained the required skills and knowledge needed at a given point to effectively demonstrate their competence to perform the tasks set out.

Assessment

In assessing the achievement of competences in section B-V/f* from the STCW Code, assessors should be guided by the criteria for evaluating competences.

Course assessment

An online assessment using multiple-choice questions will be completed by each student at the end of the course. The NI will administer an online assessment. Participants successfully completing the assessment will be issued with a course completion certificate. Candidates will also be required to undertake a practical assessment administered by the centre. The following are to be part of a practice exam on the Class "B" simulator. Using the DP system display:

- Identify a thruster pitch feedback/rpm error.
- Identify a thruster command error.
- Identify a position reference system fault, failure or degradation.
- Identify a sensor fault or failure.
- Identify a power plant configuration where the redundancy concept could be defeated.
- Identify a scenario where the vessel is being operated beyond its redundant limits so the WCFDI is defeated.
- Identify an alternative thruster or power configuration (thruster or generator not available) and determine whether or not the redundancy concept is intact or defeated. Can operations be conducted?
- Describe actions with reference to ASOG/CAMO/TAM in response to an equipment status change.

Online assessment

The trainee must pass an online assessment at the training centre to be awarded a certificate of completion for the DP Vessel Maintainer Course. The exam is composed of multiple-choice questions and shall be completed in 1 hour 30 minutes. The online assessment will consist of 40 questions and shall be completed with a pass mark of 70%.

Students who fail at the first attempt can have another two attempts within six months of the first attempt; however, the second attempt must be undertaken within 96 hours of the first attempt. Failing these three initial attempts, the student is required to repeat the DP Vessel Maintainer Course and undertake the assessment again.

On successful completion of the DP Vessel Maintainer Course and online assessment, the trainee Dynamic Positioning Vessel Maintainer will be issued with a Nautical Institute Dynamic Positioning Vessel Maintainer's logbook in which their courses, DP sea time, task completion and Statement of Suitability as a DPVM are recorded.

The Nautical Institute

Annex J

Training and Certification Scheme for DP Station keeping Systems for Remote Operations (Remote DP Operator Certificate)

February 2025 – Version 1

Disclaimer
While every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. Likewise, The Nautical Institute cannot be held responsible for any damage to property or personnel while following these guidelines. This information is produced in good faith, but The Nautical Institute cannot guarantee the accuracy and/or completeness of the information, which is produced for guidance purposes only.

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Document version control

NI Training and Certification Scheme for DP Station keeping Systems for Remote Operations (Remote DP Operator Certificate)		
Title	**Version**	**Date**
NI Training and Certification Scheme for DP Station keeping Systems for Remote Operations (Remote DP Operator Certificate))	1	20/02/2025

Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)
	Terminology replaced	RCC	Remote Operation Centre (ROC)

Table of contents

1. Introduction

This document provides guidance on the Nautical Institute Training and Certification Scheme for DP Station Keeping Systems for Remote DP Operator Certificate.

A Remote DP Operator Certificate is a Nautical Institute certificate for an officer operating a remote vessel while the vessel is engaged in DP operation from a remote location.

2. Development of the Scheme

The scheme was developed based on feedback from the industry and operators of remotely operated vessels.

The scheme consists of:

- Training centre-based NI standard induction and NI simulator courses.
- The NI online exam for induction and simulator.
- NI Model Course - DP Station keeping Systems for Remote DP Operator Certificate.
- Sea time operating DP remotely.
- Completion of a Remote DP Operator NI Logbook and tasks.

3. The Role of The NI

The Nautical Institute facilitates and administers the accreditation of dynamic positioning training centres and the certification of DP operators as per the standard agreed by industry and flag administrations. The Remote DP Operator course takes a holistic approach covering both industry best practices for onboard DPO training with the addition of remote operations training. This is to maximise the use of current training centres and allow for new officer, partly trained or fully trained DPO to join remote operations.

4. International Safety Management (ISM) Code and DP Training

The scheme is considered as training towards the Nautical Institute DP Station keeping Scheme for Remote DP Operator Certificate.

The company should provide further training, experience, and competency assessment as per IMCA M117 and the ISM Code.

The objectives of the ISM Code are to ensure the safety of life at sea, prevent human injury or loss of life and avoid damage to the marine environment and property.

All companies operating and/or owning ships must:

a. Provide for safe practices in ship operations and a safe working environment.
b. Establish safeguards against all identified risks.
c. Continuously improve safety management skills of personnel ashore and onboard ships, including preparing for emergencies related to safety and environmental protection.
d. Comply with all mandatory rules and regulations.
e. Ensure that applicable codes, guidelines and standards recommended by IMO, flag states, classification societies and marine organisations are considered.

Regarding remote operations, the ship operator, whether owner or charterer, must ensure that remote DP operators undertake suitable initial training covering all relevant duties and operations of controlling the vessel remotely, including normal operations and emergencies. The NI does not provide remote DP operator training; instead, it accredits the training institutions to offer training to remote DP operators.

5. Scheme Overview

The Remote DP Operator certificate is designed to make the maximum use and knowledge of existing NI training centres, NI approved DP instructors, officers new to the remote vessel or DP vessel industries, partly trained officers and existing DPOs to ensure a suitably-trained and skilled workforce to operate DP vessels remotely.

The knowledge required of a remote DP operator is broadly the same as that of a DP operator on a crewed vessel. Supplemental knowledge is, however, needed to cover the operation of a vessel remotely. The training core is based on industry best practice of the Nautical Institute DP operators' certificate.

6. Training Scheme

By completing the Training Scheme for DP Station Keeping Systems for Remote Operations, the DP operator will receive a DP Certificate: 'Dynamic Positioning Station Keeping Systems for Remote Operations'. This type of certification is restricted to DPOs who have completed the required DP training through remote DP Systems.

DP Station Keeping Systems for Remote Operations training differs from the offshore training scheme, and trainees should look carefully at these differences. The training scheme uses the same offshore logbook for recording the time when engaged in DP Operations, but additional documents must be completed.

The scheme uses The NI Remote DP Operator logbook to record operational experience on remotely-stationed DP systems. A minimum of 120 hours (achieved in not less than 40 days) engaged in operating a remotely- operated DP-classed vessel must be completed in Phase B along with the task sections and then Phase D of another 120 hours (achieved in not less than 40 days) engaged in operating a remotely-operated DP-classed vessel. Up to and including a maximum of two hours can be recorded in one operational day. The hours and DP operational experience in phases B and D must be recorded carefully and accurately entered in the relevant sections. The DP class and the DP system must be entered.

The task section used in the Training Scheme for DP Station keeping Systems for Remote Operations Scheme is also different from the offshore training scheme. It reflects the sector needs and is kept under regular review to address contemporary needs and operations. The separate task section in the offshore logbook is to demonstrate evidence of operational experience in the completion of specific tasks relating to this scheme.

This task section can only be signed off by a Remote Operation Centre (ROC) Master holding a DP Certificate. Those responsible for signing this section of the logbook should adhere to high professional standards and appropriately rigorous assessments of trainees before signing that a training task has been completed.

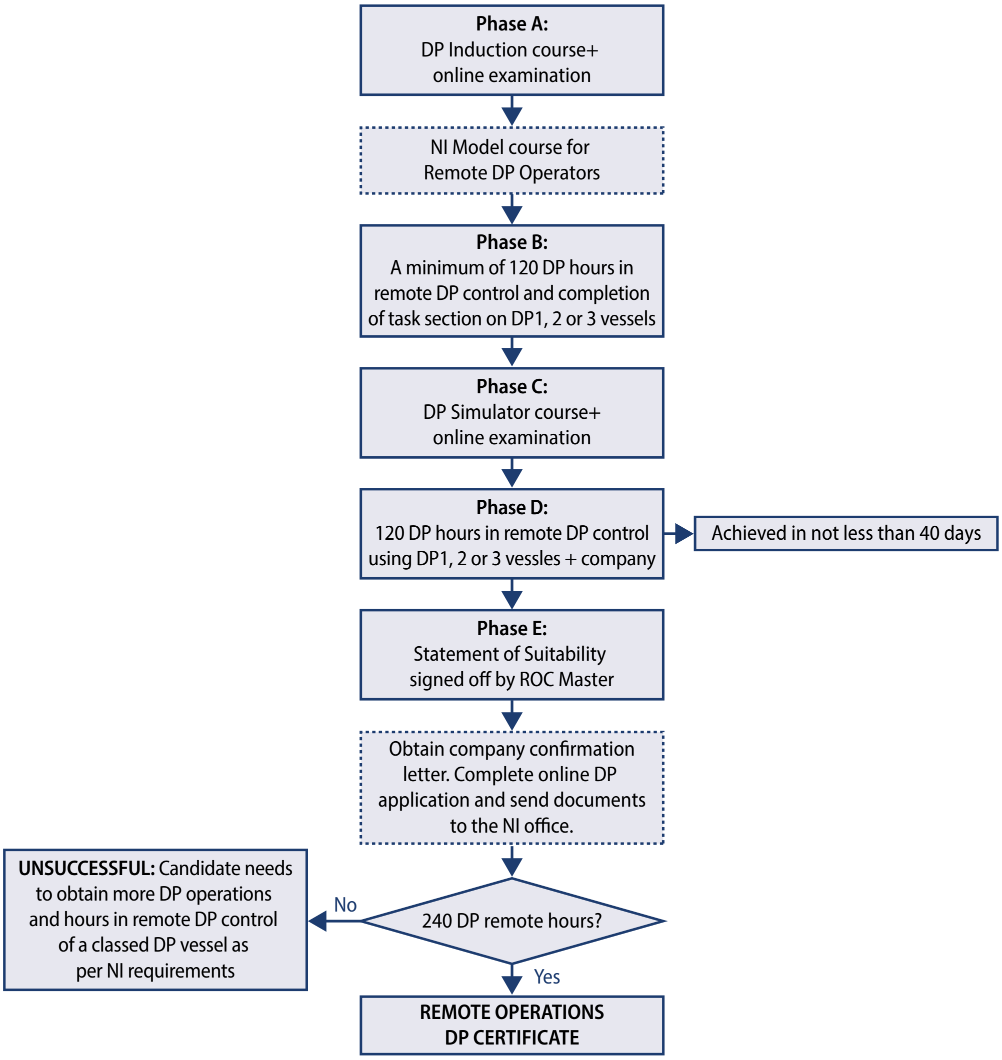
The tasks must not be block signed; each task must be signed and dated individually.

The ROC Master is required to countersign each section once all tasks in that section have been completed and signed by a certificated remote DPO. If the Master is a certificated remote DPO, then a note shall be made in the logbook and the master's DP certificate number must be annotated for verification. The Master can then sign both sections. The signature confirming the time engaged in DP operations in the logbook should match the master's signature for the tasks for the dates that they were engaged in DP operations.

Operating company confirmation letters are required for all DP operations including dynamic positioning training experience.

Any DP operational experience gained while the logbook is at The NI for verification can be counted towards gaining certification or applying for an upgrade.

Station keeping systems for remote operations DP certificate flowchart



7. Scheme Layout

Phase A: NI DP induction course

Standard NI induction course provided by an accredited training centre and covers content as listed in the Appendices. Nautical Institute Certification and Accreditation Standard, Vol.1 – (Current version) plus NI online exam.

Layout of the Nautical Institute Training and Certification Scheme for Remote DP Operators.

Phase A1 NI Model course for DP station keeping system for remote DP operator certificate.

Complete detail of this course is in Appendix 1. The course covers all extra knowledge required to operate a vessel remotely.

Phase B: DP Sea time onboard active DP vessel and task section of logbook

The officer is required to log 120 hours of remotely operating a vessel controlled by a DP system in a minimum of 40 days and complete the task section of the Remote DP Operator NI Logbook before attending The NI Simulator course.

Phase C: NI DP Simulator course

Standard NI Simulator course provided by an accredited training centre and covers content as listed in the Appendices. Nautical Institute Certification and Accreditation Standard, Vol.1 – (Current version) plus NI online exam.

Phase D: DP sea time onboard active DP vessel and task section of logbook

The officer must log an extra 120 hours of remotely operating a Vessel controlled by a DP vessel in a minimum of 40 days, complete the task section of the Remote DP Operator NI Logbook and obtain a company confirmation letter.

Part 3: Statement of suitability

Statement of Suitability signed off by Remote DP Operator Team Leader.

Notes on remote DP sea time

All remote DP sea time shall be when the DP operator controls a remotely operated vessel from a remote location and when the vessel is controlled in fully auto DP mode. A company confirmation letter to be supplied to NI covering all remote DP sea time.

8. Minimum Entry Requirements

Following the 2010 Manila amendments to the STCW Convention and Code, The Nautical Institute (The NI) has implemented the following criteria for entry into the DP Operators training scheme:

The minimum qualification is set at STCW Regulation II/1 - II/2 - II/3 Deck, Regulation III/1 – III /2 – III/3 – III/6 Engine and Regulation III/6 for ETOs

STCW	Definition
II/1 Deck	Officers in charge of a navigational watch on ships of 500gt or more.
II/2 Deck	Master or chief mate on ships of 500gt or more.
II/3 Deck	Officers in charge of a navigational watch and Masters on ships of less than 500gt.
III/1 Engine	Officers in charge of an engineering watch in a manned engine room or designated duty engineers in a periodically unmanned engine room.
III/2 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000kW propulsion power or more.
III/3 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of between 750kW and 3,000kW propulsion power.
III/6 ETO	Electro-Technical Officer

Alternative appropriate Marine Vocational Qualifications (MVQs) will be considered on a case-by-case basis. The NI defines an MVQ as " a non-STCW Certificate of Competency issued by a white list Maritime Administration for use in the administration's local waters only."

9. Revalidation

The Remote DP Operator Certificate is valid for five years. To maintain the currency of the certificate, the holder shall obtain at least 300 hours of service as a Remote DP Operator within the past five years and continue to hold a valid watchkeeper certification for the type and size of the vessel that is being remotely controlled.

10. Recognition of Prior Learning

The Remote DP Operator certificate is designed to maximise existing trained DPOs and provide a framework for training remote vessel personnel to conduct DP operations.

Officers who have prior learning (Phase A) – The NI Induction course and passed the online exam – only.

- Complete NI Model Course for Remote DP Operators.
- Complete sea time and task section in The NI Remote DP Operator Logbook.
- Complete NI DPO Simulator Course.
- Complete sea time and record in The NI Remote DP Operator Logbook.
- Statement of Suitability signed off by Remote DP Operator Team Leader.

Officers who have prior learning – NI Induction and Simulator course and passed both online exams.

- Complete The NI Model Course for Remote DP Operators.
- Complete sea time and task section (Phase B and D) in The NI Remote DP Operator Logbook.
- Statement of Suitability signed off by ROC Master.
  Note sea time onboard a vessel does not count towards Remote DP operator.

Officers who have prior learning – Holder of an Offshore DPO certificate:

- The existing DPOs must complete the model course and 120hrs at ROC before applying for the certificate to The NI Model Course for Remote DP Operators.
- Complete all sea time and task sections (Phase B) in The NI Remote DP Operator Logbook.
- Statement of Suitability signed off by ROC Master.
  Note sea time onboard a vessel does not count towards Remote DP operator.

Note: Officers can use two NI DPO Logbooks

1. One for use during remote operation.
2. One for use when working offshore onboard a DP Vessel.
3. The NI permits the induction and the simulator courses to be recorded into both logbooks.
4. If the induction and/ or simulator course has been conducted prior to the remote logbook being in use, a note referencing the other logbook can be inserted.

11. Appendix 1: NI Model course – DP Station Keeping Systems for Remote DP Operator Certificate

The NI Model course of Remote DP Operator covers all extra knowledge required to operate a vessel in DP remotely. The course can be conducted online at an accredited NI training centre and NI approved ROC.

See Appendix 1 for complete details.

Appendix 1. DP Station Keeping Systems for Remote DP Operator Certificate Model Course

Introduction

This document covers the extra training for remote DP operators, which is required and the Nautical Institute training for the Offshore DP Scheme.

The Remote DP Operator certificate is designed to maximise existing trained DPOs and provide a framework for training remote vessel personnel to conduct DP operations.

The knowledge required of a remote DP operator is broadly the same as that of a DP operator on a crewed vessel. Supplementary knowledge is, however, required to cover the operation of a vessel remotely. The training core is based on the industry best practice of the Nautical Institute DP operators' certificate.

Purpose of The NI model course for a Remote DP Operator Certificate

The purpose of The NI model course is to assist NI Approved Training Centres and their teaching staff so the quality and effectiveness of the training courses may thereby be controlled and maintained.

As in all training endeavors, the knowledge, skills, competence, and dedication of instructors are the key components in transferring knowledge and skills to those being trained through The NI standards.

This model course shall be a minimum duration of three days with a minimum of 20 training hours, including classroom instruction and assessments. The course covers the theoretical knowledge and extra training required for operating a vessel using dynamic positioning remotely from a Remote-Operation Centre (ROC).

The NI Model course for Remote DP Operators can be conducted online by The NI approved ROC or a training centre that the Nautical Institute approves.

Layout of the Nautical Institute Training and Certification Scheme for Remote DP Operators.

Phase A. NI DP Induction Course

Standard NI induction course provided by an accredited training centre covers the content listed in the Appendices.

Nautical Institute Certification and Accreditation Standard, Vol.1 – (Current version) plus The NI online exam.

Phase A1 NI Model Course for DP Station Keeping System for Remote DP Operator Certificate.

Full details of this course are in Appendix One. The course covers all the extra knowledge required to operate a vessel in DP remotely.

Phase B: DP sea time will be gained from an active DP vessel and Task Section of Logbook completed remotely.

The officer is required to log 120 hours of remote vessel operation whilst controlled by a DP system over a minimum of 40 days and complete the task section of the Remote DP Operator NI Logbook.

Phase C: NI DP Simulator Course

Standard NI Simulator course provided by an accredited training centre covers content as listed in the appendices. The Nautical Institute Certification and Accreditation Standard, Vol.1 – (Current version) plus The NI online exam.

Phase D: DP Sea Time will be gained remotely from an active DP vessel and Task Section of Logbook Completed.

The Officer must log an extra 120 hours of remote vessel operation whilst controlled by a DP system over a minimum of 40 days, complete the task section of the Remote DP Operator NI Logbook and obtain a company confirmation letter.

Part 3: Statement of Suitability

Statement of Suitability signed off by Remote DP Operator Master.

Recognition of Prior Learning

The Remote DP Operator certificate is designed to maximise existing trained DPOs and provide a framework for training remote vessel personnel to conduct DP operations.

Officers who have prior learning (Phase A) – The NI Induction course and passed the online exam – only.

- Complete NI Model Course for Remote DP Operators.
- Complete sea time and task section in The NI Remote DP Operator Logbook.
- Complete NI DPO Simulator Course.
- Complete sea time and record in The NI Remote DP Operator Logbook.
- Statement of Suitability signed off by Remote DP Operator Team Leader.

Officers who have prior learning – NI Induction and Simulator course and passed both online exams.

- Complete The NI Model Course for Remote DP Operators.
- Complete sea time and task section (Phase B and D) in The NI Remote DP Operator Logbook.
- Statement of Suitability signed off by ROC Master.
  Note sea time onboard a vessel does not count towards Remote DP operator.

Officers who have prior learning – Holder of an Offshore DPO certificate:

- The existing DPOs must complete the model course and 120hrs at ROC before applying for the certificate to The NI Model Course for Remote DP Operators.
- Complete all sea time and task sections (Phase B) in The NI Remote DP Operator Logbook.
- Statement of Suitability signed off by ROC Master.
  Note sea time onboard a vessel does not count towards Remote DP operator.

Note: Officers can use two NI DPO Logbooks

1. One for use during remote operation.
2. One for use when working offshore onboard a DP Vessel.
3. The NI permits the induction and the simulator courses to be recorded into both logbooks.
4. If the induction and/ or simulator course has been conducted prior to the remote logbook being in use, a note referencing the other logbook can be inserted.

Use of The NI Remote DP Operator model course

To use the model course effectively, instructors should review the course plan and detailed syllabus, considering the information on the entry standards specified in the course framework. The trainees' actual level of knowledge, skills, and prior education should be kept in mind during this review and any areas within the detailed syllabus that may cause difficulties because of differences between the actual trainee entry-level and that assumed by the course designer should be identified. The Nautical Institute shall approve the course material.

Lesson plans

To ensure the standard of training delivery of this new course, The Nautical Institute will supply lesson plans based on the detailed teaching syllabus via an industry working group. Instructors should pay due attention to the trainee's background and previous knowledge when adjusting the course content to suit the trainee's intake and advise of any revision of the course objectives required.

Presentation

The Nautical Institute will review and approve the training material.

Implementation

For the course to run smoothly and to be effective, considerable attention should be paid to the availability and use of:

- Properly qualified instructors.
- Suitable teaching and other spaces.
- Appropriate training equipment and teaching aids.
- Videos and multimedia presentations.
- Soft copy or hard copy training notes.
- Nautical Institute knowledge base database of training materials.

Validation

The guidance in this document has been validated by the Nautical Institute Dynamic Position Training and Executive Group (DPTEG) on Human Element, Training and Watchkeeping for use in ROC to control remote- operated DP vessels.

Part A : Course framework

Aim

To give the student the following:

Understanding of the theoretical and practical operation of a remotely operated DP vessel.

Scope

Operators are responsible for designated dynamic positioning duties associated with the care, use or emergency response of remotely operated DP vessels.

Minimum entry requirement

Following the 2010 Manila amendments to the STCW Convention and Code, The Nautical Institute (The NI) has implemented the following criteria for entry into the DP Operators Training Scheme:

The minimum qualification is set at STCW Regulation II/1 - II/2 - II/3 Deck, Regulation III/1 – III /2 – III/3 – III/6 Engine and Regulation III/6 for ETOs

STCW	Definition
II/1 Deck	Officers in charge of a navigational watch on ships of 500gt or more.
II/2 Deck	Master or chief mate on ships of 500gt or more.
II/3 Deck	Officers in charge of a navigational watch and Masters on ships of less than 500gt.
III/1 Engine	Officers in charge of an engineering watch in a manned engine room or designated duty engineers in a periodically unmanned engine room.
III/2 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000kW propulsion power or more.
III/3 Engine	Chief engineer officers and second engineer officers on ships powered by main propulsion machinery of between 750kW and 3,000kW propulsion power.
III/6 ETO	Electro-Technical Officer

Alternative appropriate marine vocational qualifications (MVQs) will be considered on a case-by-case basis. The NI defines an MVQ as "a non-STCW Certificate of Competency issued by a white list Maritime Administration for use in the administration's local waters only."

Staff requirements & Instructor Qualifications

The course shall be conducted by an NI-approved DP instructor who has demonstrated sufficient knowledge of remote operation.

Teaching facilities and equipment

The course shall be conducted in a Nautical Institute Approved training centre. Suitable teaching spaces shall be equipped with equipment required by the Nautical Institute Certification and Accreditation standard, Vol.2 – (Current version)

Delivery of training shall be effective, which can be achieved through lectures, group exercises and discussions, as appropriate. The use of multi-media and simulation is intended, it should be ensured that the appropriate multi-media equipment and simulators are made available.

When the course is conducted online, group discussions and student feedback shall form part of training delivery.

Delivery Method

The course will be theoretical and give the participant an overview of remote DP operation and the effects of system and component failures. Upon completion of this course, participants will understand the typical architecture of Remote DP systems and the principles of remote DP operation.

The course is set up to allow some or all course contents to be presented using online delivery methods. The student- to-instructor ratio will be a maximum of eight students to one instructor, regardless of training delivery method, to ensure proper learning.

Part B : General outline

Timetable

The course shall be a minimum duration of three days with a minimum of 20 hours teaching time.

Course Outline

- Introduction to the remote operation of maritime systems.
- Vessel tasking and monitoring.
- Control centre organisation.
- Introduction to mission risks and mitigations during remote operation.
- Off-nominal conditions – response and mitigation.
- Remote sensors.
- Autonomous remotely operated systems and case studies.
- Future Developments.
- Cross-industry learnings (road, rail, aviation).
- Task section of the remote DPO logbook.
- DP system screen for fault finding.

The course comprises lectures and videos of ROC and remote DP operators controlling a DP vessel.

The learning objective format is used in the detailed teaching syllabus given in Part C; the outline below summarises the course material. The numbering system used below reflects that of the detailed teaching syllabus.

Course Assessment

An assessment using multiple-choice questions will be completed by each student at the end of the course.

Part C: Detailed outline

Learning objectives

The following detailed course outline has been developed in learning objectives.

1 Introduction to the remote operation of maritime systems
1.1 Simple description
1.1.1 Why remote operation vs manned operation
1.1.1.1 Manned vessel
1.1.1.2 Unmanned vessel
1.1.2 Remote control vs remote monitoring
1.1.3 Operation from a standby vessel
1.1.4 Operation from shore-based ROC
1.1.5 Remote operation using onboard autonomy (example – remote command for DP to move vessel)
1.1.6 Remote operation without onboard autonomy (example – remote joystick control)
1.2 Important elements
1.2.1 Data communications
1.2.1.1 Coastal (cellular)
1.2.1.2 Mid ocean (satellite)
1.2.1.3 Other (vessel to vessel)
1.2.1.4 Communications redundancy

1.2.1.5 Link latency
1.2.1.6 Bandwidth
1.2.1.7 Throughput throttling, dropped packets, antenna shadowing
1.2.1.8 Data compression
1.2.1.9 Cyber/link security
1.2.2 Situational awareness – for navigational purposes
1.2.3 Situational awareness – onboard vessel (eg need to monitor offloading operations while holding station next to a rig)
1.2.4 Need for onboard functions (eg collision detection during navigation)
1.2.5 Voice communications with other vessels (eg remote VHF)
1.2.6 SOLAS – providing aid to other vessels in need
1.3 Regulations
1.3.1 Ship design
1.3.2 Responsible party
1.3.3 Jurisdiction (ROC in Norway, remote vessel flag state is Bahamas, vessel collides with another vessel off coast of Africa with loss of life)
2 Vessel tasking and monitoring
2.1 Need for operational protocols
2.1.1 Operational start up (at dock or anchor)
2.1.2 Coastal and high traffic area operation
2.1.3 Oceanic operation
2.1.4 Protocol for handover to another operator, or control transfer to another desk in ROC
2.1.5 Risk analysis
2.1.6 Safe operation
2.2 Monitoring vessel data
2.2.1 Engines and generators
2.2.2 Propulsion, steering and thrusters
2.2.3 Trim and ballast
2.2.4 No audio or tactile feedback (no deck vibration at ROC)
2.2.5 Identification of problems based on instrument data only
2.2.5.1 For low bandwidth data links may only receive a reduced set of data, or update rate for some data may be low.
2.2.5.2 May have to direct that specific data is sent to identify a root cause
2.2.6 Alerts and alarms
2.3 Situational awareness
2.3.1 Sensor fusion presentation
2.3.2 Vessel's 360-degree by video
2.4 Vessel radio(s) and voice communication

3 Control centre organisation
3.1 Staffing of ROC
3.1.1 Management
3.1.2 Responsibilities
3.2 Need for controlled access to physical control centre(s) within ROC – security
3.3 Control desk
3.3.1 One per vessel
3.3.2 One per multiple vessels
3.3.3 Protocol to hand desk over to another operator
3.3.4 Protocol to hand vessel over to another desk
3.3.5 Desk equipment failure
3.4 Need for standardisation (can one desk operate with equipment from different suppliers of shipboard equipment?)
3.5 Record keeping
3.5.1 Logbook
3.5.2 Data logs
4 Introduction to mission risks and mitigations during remote operation
4.1 Degrading or loss of communications with vessel
4.2 Equipment failure
4.3 Piracy
4.4 Sensor spoofing or other malicious interference
5 Off-nominal conditions – response and mitigation
5.1 Escalation of issues
5.2 Degrading or loss of communication with vessel
5.3 Physical security threats to vessel
5.4 Cyber attacks
5.5 Suspected sensor spoofing
5.6 Maritime emergency response – SOLAS
5.7 ROC emergency response (eg fire, physical attack, earthquake)
5.8 Pollution prevention
5.9 Vessel allision, collision, or other on-vessel problem
6 Remote sensors
6.1 Position, heading and environmental)
6.2 Sensor fusion and presentation of data
6.2.1 Video
6.2.1.1 Visual presentation
6.2.1.2 Object detection

6.2.1.3 Distance measurement
6.2.1.4 Single camera vs dual camera (stereoscopic)
6.3 LIDAR
6.3.1 Object detection
6.3.2 Distance measurement
6.4 Radar
6.4.1 Object detection
6.4.2 Distance measurement
6.5 AIS
6.6 Audio
7 Autonomous Remotely operated systems and case studies
7.1 Concepts of uncrewed remotely controlled maritime autonomous surface ship
7.2 Industry regulations and responsibilities
7.3 Understanding some seafarer training needs
7.4 Principles of autonomous systems
7.5 Safety principles and risk assessment onboard
7.6 Command control and communication skills
7.7 Cognitive and technical skills,
7.8 Some skills for human-machine interaction
7.9 System checks and planned maintenance
7.10 Rough sea awareness and handling
7.11 Route planning and monitoring and operational limits
7.12 Emergencies contingencies and degraded sensors such as GPS and gyro errors
7.13 Bridge team management structure onboard
8 DP system screen for fault finding

The Nautical Institute

Annex K

Continuing Professional Development (CPD) for Revalidation of the Nautical Institute DP Operator Certificate and DPVM Certificates

February 2025 – Version 1

Disclaimer

While every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. Likewise, The Nautical Institute cannot be held responsible for any damage to property or personnel while following these guidelines. This information is produced in good faith, but The Nautical Institute cannot guarantee the accuracy and/or completeness of the information, which is produced for guidance purposes only.

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Document version control

Continuing Professional Development (CPD) Accreditation standard		
Title	**Version**	**Date**
Continuing Professional Development (CPD)	1	20/02/2025

Table of changes

Page	Subject	Original content v1 (February 2024)	New content v1 (February 2025)
229	Section 2- Time to complete the CPD Scheme Certificate		Previous years CPD can be released.

Table of contents

1 CPD for revalidation for The Nautical Institute DP Operator Certificate and DPVM Certificates

1.1 Introduction to The NI CPD standard

The dynamic positioning industry has asked The Nautical Institute to provide a solution to help stop skill fading and keep knowledge updated to ensure safe DP operations.

This document provides standards for CPD schemes approved by The NI.

This accreditation standard has been developed taking into consideration the following documents:

- IMCA M117 and relevant IMCA documents.
- OCIMF Dynamic Positioning Assurance Framework risk-based guidance.
- MTS DP documents.
- NI *DP Operator's Handbook*.
- IMCA DP Event Reporting Scheme.
- Advice from Industry stakeholders through DPTEG.

These standards have been developed and are kept up to date with the full engagement and cooperation of the Nautical Institute DP Training Executive Group (DPTEG).

1.2 The Role of The Nautical Institute

The Nautical Institute facilitates and administers the accreditation of continuing professional development schemes (CPD) for revalidating the Nautical Institute DP Operator Certificate and DPVM certificates as per this standard approved by DPTEG.

The NI will run a CPD workshop every year with CPD providers to review CPD content.

1.3 The International Safety Management Code (ISM) and Dynamic Positioning (DP) Training

The NI DP CPD scheme is considered part of the ISM Code's "continuously improve" training and is part of the Nautical Institute revalidation of the DP Operator's Certificate and the DP Vessel Maintainer's Certificate.

IMCA M117 guidelines and the ISM Code

The objectives of the ISM Code are to ensure the safety of life at sea, prevent human injury or loss of life and avoid damage to the marine environment. The International Maritime Organization's Maritime Safety Committee (MSC) issued circular MSC/Circ.738, which noted that IMCA had prepared a publication on the "Training and experience of key DP personnel" and invited member governments to bring that publication to the attention of the bodies concerned and apply the guidelines to the training of key DP personnel.

All companies operating and/or owning ships must:

- Provide for safe practices in ship operations and a safe working environment.
- Establish safeguards against all identified risks.
- Continuously improve safety management skills of personnel ashore and onboard ships, including preparing for emergencies related to safety and environmental protection.
- Comply with all mandatory rules and regulations.
- Ensure that applicable codes, guidelines and standards recommended by IMO, flag states, classification societies and marine organisations are considered.

Regarding DP operator and DP technical staff training, the ship operator, whether owner or charterer, must ensure "continuing improvement" programmes are in place for everyday operations and emergencies.

The NI does not provide DP training; instead, it accredits training institutions. A list of training providers for NI-accredited CPD can be found on The NI's website.

1.4 Overview of The Nautical Institute's DP Revalidation and the use of CPD

The main aim of The NI revalidation is to stop skill-fade and continue upgrading skills to ensure safe DP operations.

Pathways to revalidation of NI DP Operator Certificate and DPVM Certificate

Deck officers

A. To revalidate DP Certificate, in addition to the 150 DP days of sea time or equivalent, DPO's will need to:

   - Pass The NI Revalidation online exam and Complete The NI-approved Continuing Professional Development (CPD) Programme

   or

   - Complete The NI DP Refresher and Competency Assessment Course. The Refresher course maybe completed up to twelve months before the revalidation date set by The NI.

B. DPO with 30 days or more DP Sea-time may revalidate with the following option:

   - NI DP Refresher and Competency Assessment Course.

C. DPO with no DP sea time or less than 30 days must complete The NI DP Revalidation Course. When revalidating using the Revalidation Course for a second or subsequent time, the DPO must follow the rules as per the standard with respect to sea time requirements. The Revalidation Course may be completed up to twelve months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, in which time the DPO must apply to The NI for certificate revalidation.

1.5 Technical staff with the DP Vessel Maintainer Certificate (DPVM)

D. To revalidate a DPVM Certificate, in addition to 150 of sea time or equivalent, DPVM needs to :

- Pass The NI Revalidation online exam and NI-approved continuing Professional Development (CPD) Programme.

or

- NI DPVM Refresher and Competency Assessment Course- (The Refresher Course may be completed up to twelve months before the revalidation date set by The NI.

E. DPVM with 30 days or more DP sea time may revalidate with the following option:

- NI DP Refresher and Competency Assessment Course.

F. DPVM with no DP sea time or less than 30 days must complete The NI DPVM Revalidation Course. When revalidating using the Revalidation Course for a second or subsequent time, the DP technical staff must follow the rules as per the standard with respect to sea time requirements. The Revalidation Course may be completed up to twelve months before the revalidation date set by The NI. The course will be valid for a period of 12 months only, in which time the DPO must apply to The NI for certificate revalidation.

Regardless of which option is taken, The Nautical Institute recommends using The NI-approved CPD for all the officers.

1.6 Who can apply to The NI for approval to operate a CPD scheme for revalidation of The NI DPO and holder of DPVM certificate

A. All The NI-accredited training centres, following Nautical Institute approval.
B. Any other CPD supplier that meets the Nautical Institute CPD standard can apply.
To obtain approval for a CPD programme for use in NI revalidation, the following are required:

- The learning material used and the login for the CPD programme must be available to the DPO and DPVM for a minimum of five years.
- CPD can either be fully online or instructor-led training online.
- The CPD supplier must appoint a subject matter expert (SME) to monitor the content and operation of the CPD scheme. As a minimum, the SME must have seagoing experience on DP vessels with experience with FMEA and annual trials. It is recommended that they are also a NI DP instructor.
- Online questions and an answering system that are available to the officer, in order to support training.
- The DPO must be able to send feedback about the CPD
- Online DP simulation exercises or practical exercises onboard are required as per IMCA 117 & IMCA DP Event Bulletins. The CPD suppliers must incorporate these into their CPD programmes.

The Nautical Institute accreditation for the training provider and CPD is for three years and applies to the complete training programme.

1.7 Minimum requirements to use The NI-approved CPD scheme as part of revalidation

- The officer must hold a valid NI DP Operator Certificate or DP Vessel Maintainer Certificate.
- No CPD will be counted towards revalidation while the certificate is expired.

Note: Apart from their use in the revalidation process, CPD schemes should be made available and are recommended for use by all key DP personnel.

2 Time to complete the CPD Scheme Certificate

CPD, as the name suggests, should be a continuous programme throughout the five years that the officer holds a valid NI DPO Certificate or DPVM Certificate. CPD must be taken in the year that is designated as per Annex 2. CPD suppliers will only allocate CPD one year at a time during the programme. However, if the DPO hasn't started the CPD, for catching up the previous required years CPD can be released.

Regardless of whether an officer undertakes and passes an exam at the start of the CPD, the officer must participate in all CPD contents.

The officer must hold a valid NI DPO or DPVM certificate to gain sea time or use CPD for revalidation purpose. However, use of CPD is encouraged for all key DP personnel at all times.

2.1 Certificate of Completion

- A certificate is to be provided at the end of each CPD module. The CPD supplier is to confirm how many modules it is running per year. The CPD supplier can have one or, at most, two modules per year.
- The certificate lists the contents of the module completed.
- The certificate must be unique to the candidate.
- The NI is to be advised of all certifications issued, so that The NI can validate the authenticity of the certificate.

3 The process for accreditation of CPD by The Nautical Institute

Usually, only centres approved by The Nautical Institute for DP training will be accredited, after audit and approval, for running The NI DP CPD Scheme.

The CPD Scheme must be audited and reaccredited every three years.

Organisations aspiring to administer The NI CPD scheme are required to apply to The Nautical Institute. Subsequent to this application, they will be subject to an audit conducted in accordance with the established standards. Following a successful audit and formal approval, the organisation will be granted authorisation to operate The NI DP CPD Scheme The organisation must demonstrate a minimum of three years' experience in marine and offshore training.

The Nautical Institute recommends that the five-year CPD timing be at least 34 hours, which aligns with the NI Refresher and Competency Assessment Course.

3.1 Implementation of CPD scheme

Table 1 Revalidation matrix	
1 Jan 2024	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of one year of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2025	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of two years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2026	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of three years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2027	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of four years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2028	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of The NI-approved CPD programme or complete The NI DP Refresher Course. Those who do not meet all the new requirements will be given 12 months to do so, after which they can reapply for revalidation.
1 Jan 2029	A DPO/DPVM with 150 days DP sea time who is applying for revalidation will have to sit The NI Revalidation online exam and complete a minimum of five years of The NI-approved CPD programme or complete The NI DP Refresher Course. From 1 January 2029, applicants will receive the standard 3-month indemnity letter once they have submitted and paid for their online application.

3.2 Indemnity letter

All DPOs whose certificates are due to expire from 1 January 2024 until 31 December 2028, and have been unable to complete the new requirements for revalidating their certificate, will be issued with a 12-month indemnity letter once their online application has been submitted/paid. Applicants must complete the new requirements of the CPD and/or courses and resubmit their applications within a year of the issue date of the letter to be eligible to apply. The indemnity letter is not to be used by applicants to complete any of the sea time requirements for their application.

4 Requesting accreditation standard

Individuals seeking to engage in the development and accreditation of the Nautical Institute (NI) Continuous Professional Development (CPD) program are invited to request a copy of the relevant document. Additionally, this document is accessible on The NI Alexis Platform website. It is imperative to consult the most recent version for accurate and up-to-date information.

4.1 The Nautical Institute sends Standard

The Nautical Institute will send the standard to anyone interested in developing a CPD programme.

4.2 Accreditation Request

A CPD provider wishing to seek NI CPD accreditation can do so by contacting The NI's Qualifications Marine & Offshore department by email: accreditations@nautinst.org.

4.3 Contents of a Formal Request for Accreditation

The formal request for accreditation should contain the following information:

a. Details of the CPD Supplier
b. Details of the contact person and Subject Matter Expert (SME)
c. SME's CVs
d. Relevant forms such as the Accreditation application, Accreditation agreement, confidentiality agreement and checklist should be signed and sent into The NI.

4.4 Accreditation Agreement

Before any further progress towards accreditation, the CPD Supplier must sign an Accreditation Agreement with The NI.

Audit

CPD Accreditation audit based on desktop review.

The NI will provide ESTECH Shared Folder access to the CPD supplier to upload the five-year CPD modules for the desktop audit. The CPD supplier is to provide CPD online platform access to The NI for audit purposes. The NI may ask for online meetings during the document review for clarification.

Cost of Audit

A maximum of three days is chargeable for the CPD Audit and accreditation. For the cost and day rate, contact The NI's Qualifications Marine & Offshore department by email: accreditations@nautinst.org .

4.5 Documentation to submit to The Nautical Institute for the Audit

CPD Suppliers are to present the following documentation:

- Company registration certificate.
- A minimum of three years of Marine and Offshore training experience.
- Quality manual.
- Five years CPD Learning materials.
- Individual CPD modules method of assessments.
- Annex K checklist.
- Reference materials.
- Subject Matter Experts' (SME) CVs.
- Feedback form and how users can provide feedback.
- Template of the certificates to be issued by the CPD provider.
- Administrative procedures to cover registration/booking, of CPD modules etc.
- Management review policy.
- Performance appraisal policy for SMEs.
- Complaints policy.
- Control of documents policy.
- How the candidate can contact SME, if required during the course.

Results of Accreditation

The NI will write formally to award the accreditation.

The CPD supplier will be accredited to deliver CPD for three years and will be required to submit annual reports to The NI throughout this period.

4.6 Withdrawal of Accreditation

Accreditation may be cancelled or withdrawn for any of the following reasons:

- Failure to settle the accreditation/re-accreditation invoice within 90 days.
- Failure to be re-accredited within three months of the expiry date of the existing accreditation (unless agreed with The NI).
- Bankruptcy/receivership or liquidation of the accredited CPD supplier or their parent organisation.
- Failure to notify The NI of significant changes to the management, training delivery or SME.
- Misrepresentation, misuse, abuse, or misdemeanour relating to the accreditation by the accredited CPD Supplier.
- Failure to comply with The NI's policies for accreditation and certification.
- Failure to submit an annual report.
- Engaging in any illegal activity.
- End of partnership or joint venture between two accredited organisations.
- Inappropriate behaviour toward The Nautical Institute or its staff.

4.7 Recognition and Certification

On successful accreditation, The NI will issue a certificate to the provider with authorisation to add The NI's logo and the words *Accredited by The NI* to its CPD module. CPD suppliers should ensure they only use the approved NI 'Accredited' logo.

4.8 The Nautical Institute's Quality Standards and Audit Procedure

The procedures in this standard have been approved by The NI's Executive Board, which has delegated their detailed application to The NI's DP Training Executive Group (DPTEG). The group is kept informed of DP accreditation activities and keeps the accreditation and certification process under review.

A1 Appendix 1

Guidelines for the Training and Experience of Key DP personnel

(This text is taken from IMCA 117 Section 10)

10. Key DP Personnel Continuous Professional Development (CPD)

10.1 CPD Definition

For the purpose of these guidelines CPD is the systematic maintenance, improvement and broadening of knowledge, understanding, personal qualities and skills throughout the individual's working life.

Typical CPD activities include:

- attending training courses.
- work-based learning.
- distance learning and private study.
- preparation and delivery of lectures and presentations.
- writing DP related industry papers.
- attending lectures, seminars or conferences.
- acting as a mentor or instructor.

The benefits of CPD include:

- realising an individual's potential.
- improved morale and motivation.
- improved company performance.
- smarter crew appraisal processes.

CPD programmes should be an integral part of the vessel owner/operator SMS and should establish the assessment and training periods for key DP personnel and whether this is conducted onboard or ashore.

10.2 DP Competency and CPD

The interrelationship between qualification, experience, maintaining competence and the principle of revalidation is described in section 8. The development, maintenance and retention of such skills can be assured by:

- Continuous regular performance of DP operations:
  - All key DP personal should maintain a record of their experience gained on DP vessels.
- Regular training and practice of DP skills:
  - Structured training plans should be developed by companies to ensure that all personnel have the best preparation to respond efficiently and effectively to all anticipated normal, potential abnormal and emergency DP operations.
- Refresher training:
  - The risk of skill fading can be mitigated by periods of formal refresher training. Refresher training is a fundamental requirement for all DP personnel.
- Mentoring:
  - Mentoring is an effective way to develop junior personnel into better and more effective crew members. It is now accepted that people learn in different ways and understanding the character of those being mentored is key for those mentoring others. Companies should provide a structured mentoring process including issuance of guidance and objectives to mentors.
- Regular performance assessments and setting of objectives:
  - In order to mitigate the risk of skill fade, those involved in key DP roles should undergo regular performance assessment. The establishment of performance objectives and setting of other goals should be considered at annual career appraisals where used.
- Preparation for future technology and operational innovations:
  - CPD can facilitate the introduction of new technology, improved practices and procedures in a safe, timely and effective manner.

10.3 DP Refresher Training

The following should be considered when assessing whether refresher training is required:

- changes to operational conditions and circumstances.
- performance assessment or a periodic crew appraisal indicates a need for re-training.
- employment on a vessel engaged in an extended operation, for example, on a drilling unit or a floatel, which spends prolonged periods in one location.

10.4 Maintaining Personal Performance

The three main issues affecting DP personnel performance are:

- the individual's DP experience.
- the operational requirements of the DP vessel.
- the vessel specific DP system.

The following is recommended for key DP personnel:

i. Persons who have not operated a DP system for more than two years should attend a formal DP system refresher course or otherwise demonstrate their competency. DPOs should additionally complete 12 hours of simulator training or alternatively operate the DP system onboard under supervision prior to standing a watch (see Note 1 below).
ii. All effort should be made to ensure key DP personnel new to the vessel attend DP trials when these are undertaken by the vessel.
iii. Attendance at DP trials should be recognised as a positive learning experience and incorporated into the training schedules of key DP personnel to ensure as far as possible that they attend a minimum of one annual DP trial in a three-year period (see Note 2).
iv. If the vessel has not conducted DP operations for a period of 90 days or more, adequate re- familiarisation should be completed by DP personnel prior to re- commencing DP activities. This can be reduced by half if 12 hours of simulated DP system operations spread over a period of three days is completed.
v. For personnel returning to a vessel on which they served on more than two years previously, with or without DP experience in between, a minimum period (see vii) of familiarisation training is recommended (see Note 3).
vi. For recommended periods of familiarisation for key DP personnel, see section 8.
vii. The above assumes that a familiarisation procedure is in place and that personnel have time to operate equipment prior to the vessel starting work.
viii. After three years since last operating a particular type of DP system, or not operating any DP system, a DPO should be deemed to be joining a vessel with an unfamiliar DP system, guidance is provided under section 8.2.
ix. In addition to vii, a DPO who has not operated a DP control system for five years or more should re-join their DPO Training Scheme or otherwise undergo a special refresher course designed for such personnel.
x. If DP reference input systems have been changed or upgraded, training is to be conducted to ensure DP personnel are familiar with the new systems and are aware of any changes made to the FMEA.

Note 1: For DP training there are basically two types of simulators in the industry – the onboard simulator and the simulator found in a shore-based training centre. On the shore- based simulator it is usually possible to input a full range of variables, including errors and failures. The inclusion of the DP simulator into a full mission bridge simulator, where the trainee has the entire bridge to manage, including the DP system with all its inputs. Companies should consider what options are available and appropriate.

Note 2: Whilst these guidelines are the product of industry good practice, such practice may need to incorporate some flexibility to cope with the variation in individual key DP personnel's competence and ability, together with the vessel's operational requirements.

Note 3: If DP operations are not in progress, then an equivalent level of training could be provided by simulator training. See the comments in Note 1 regarding simulators.

For the latest version of IMCA 117, please visit IMCA website: www.imca-int.com.

A2 The Nautical Institute – CPD contents

"Remind, Refresh, Educate"					
Core Module DP Regulations & Guidance	**2024**	**2025**	**2026**	**2027**	**2028**
IMO - Introduction, purpose, highlights including IMO MSC/Circ. 645 and IMO Circ. 1580	x				
IMCA - Introduction, purpose, highlights	x				
MTS - Introduction, purpose, highlights			x		
MSF - inc, GOMO/MSF182				x	
Class Rules - Introduction, purpose, highlights		x			
Flag State - Introduction, purpose, highlights			x		
Regulatory updates in the last 12 months	x	x	x	x	x
New or update publications and bulletins in the last 12 months	x	x	x	x	x
Management of change - The importance, lessons learned through station keeping events.	x	x	x	x	x
IMCA DP Station keeping Event Reporting Scheme	x			x	
Lessons learned from DP Station Keeping Events	x	x	x	x	x
DP Emergency Drills and Scenarios - Rules, guidance, purpose, results criteria, (examples annually)	x	x	x	x	x
Roles & Responsibilities of Key DP personnel (according to M117)	x		x		x
DP Testing & Trials					
FMEA	x				
FMEA - purpose, class & guidance requirements, class involvement, specific guidance, objectives, failure types (such as single, common and hidden)	x				
FMEA Proving trials - guidance, purpose, requirements, what should be demonstrated (such as redundancy concept, effectiveness of protective functions, stability of the system over full range of load conditions, monitoring functions, degraded and failure condition.)	x				
FMEA 5 years proving trials - purpose, requirements, guidance, what should be demonstrated, etc	x				
DP Annual Trial	x			x	
IMCA M190, purpose, class & guidance requirements, class involvement, specific guidance, objectives, IMCA DP Practitioner Accreditation Scheme	x			x	

Field Arrival Trials		x			
Guidance, purpose, requirements, what should be demonstrated		x			
Redundancy Concepts	x				
Worse Case Failure (WCF) & Worst-Case Failure Design Intent (WCFDI) - explained	x	x	x	x	x
DP Capability plots - Purpose, IMO/Class requirements	x			x	
Open/closed bus operations - Rules, guidance, considerations, risks,	x	x	x	x	x
Configuration - The importance of the FMEA, consequences of configuration errors	x	x	x	x	x
Cross Connections - the risks and managing those risks	x	x	x		
DP Position Reference Systems and Sensors					
Introduction to Position References & Sensors	x			x	
Different principles including relative & absolute and general challenges eg, blocking of signals	x			x	
Considerations for appropriate selection of PRS for DP operations	x			x	
PRS interaction and calibrating PRS	x			x	
PRS Lessons learnt from DP events	x			x	
DGNSS		x			
Overview, advantage, disadvantage		x			
Operational & failure considerations		x			
Lessons learnt from DP DG events		x			
New developments in last five years		x			
Laser		x			
Overview, advantage, disadvantage		x			
Operational & Failure considerations		x			
Lessons learnt from DP laser events		x			
New developments in last five years		x			
Laser (no reflector)		x			
Overview, advantage, disadvantage		x			
Operational & Failure considerations		x			
Lessons learnt from DP laser events		x			
New developments in last five years		x			
Microwave	x				
Overview, advantage, disadvantage	x				
Operational & Failure considerations	x				
Lessons learnt from DP laser events	x				
New developments in last five years	x				

Hydroacoustic			x		
Overview, advantage, disadvantage			x		
Operational & failure considerations			x		
Lessons learnt from DP Events			x		
New developments in last five years			x		
INS			x		
Overview, advantage, disadvantage			x		
Operational & failure considerations			x		
Lessons learnt from DP Events			x		
New developments in last five years			x		
Taut wire			x		
Overview, advantage, disadvantage			x		
Operational & failure considerations			x		
Lessons learnt from DP Events			x		
New developments in last five years			x		
Gangway sensors			x		
Overview, advantage, disadvantage			x		
Operational & failure considerations			x		
Lessons learnt from DP Events			x		
New developments in last five years			x		
Wind sensor			x		
Overview, advantage, disadvantage			x		
Operational & failure considerations			x		
Lessons learnt from DP Events			x		
New developments in last five years			x		
Heading sensor				x	
Overview, advantage, disadvantage				x	
Operational & failure considerations				x	
Lessons learnt from DP Events				x	
New developments in last five years				x	
MRU/VRU					x
Overview, advantage, disadvantage					x
Operational & failure considerations					x
Lessons learnt from DP Events					x
New developments in last five years					x

Current sensor					x
Overview, advantage, disadvantage					x
Operational & failure considerations					x
Lessons learnt from DP Events					x
New developments in last five years					x
Tension sensor					x
Overview, advantage, disadvantage					x
Operational & failure considerations					x
Lessons learnt from DP Events					x
New developments in last five years					x
Draught sensor					x
Overview, advantage, disadvantage					x
Operational & failure considerations					x
Lessons learnt from DP Events					x
New developments in last five years					x
DP System Computer, Controllers, Network, IJS					
General					
DP System Computer, Controllers - Overview inc. controllers & operator stations		x			
DP System Computers and controllers- Lessons learnt from DP Events		x			
Mode changes (such as auto to manual)		x			
Lessons learnt from DP general events					
DP Networks	x				
DP Network system - overview & the risks, guidance available	x	x	x	x	x
DP Network system - Operational & failure considerations	x			x	
Lessons learnt from DP Network system events	x	x	x	x	x
IJS overview			x		
Rules & guidance			x		
Power supplies - Redundancy philosophy			x		
Location of control station			x		
Exercises & drills			x		
Power and power generation systems and UPS					
General			x		
Power management (eg general requirements/impact of mission equipment such as its effect on station keeping capability), operating within capability)			x		
Blackout prevention				x	

Load-dependent starting & stopping of power generation					x
Power generation - basics of frequency & voltage control (active & reactive power)					x
Open and closed bus operation	x	x	x	x	x
Short circuit testing			x		
Power limit – As per IMO 1580	x	x	x	x	x
Hybrid battery systems - Guidance, concept, principles, risks				x	
UPS - following redundancy, the requirements of operation				x	
DC grids			x		
Lessons learnt from general events		x		x	
Thrusters and thruster control systems					
Thrusters - Overview			x		
Thruster types - Overview, advantage, disadvantage			x		
Thruster allocation/modes of operation - eg bias and considerations therein			x		
Thruster control system - the basics including EM stops and emergency/backup controls			x		
Thrusters - Failure modes and their effects on operations			x		
Lessons learnt from DP thruster events			x		
New developments in last five years			x		
DP operations	x			x	
Operational planning & decision support tools	x			x	
General operational planning – configuration of DP systems (CAM / TAM) and ASOG to define operational, environmental and equipment performance limits applicable when operating vessel and provide guidance on actions in the event of these limits being exceeded.	x			x	
DP alert light system	x			x	
DP setup procedures	x			x	
DP watch keeping procedures		x			x
Environment conditions		x			x
DP operations manual		x	x		x
Layout of company standard operating procedures and vessel-specific DP operating procedures			x		
DP logs and checklists			x		
Purpose, overview of expectations / requirements			x		
Capability plots and footprint plots			x	x	
Simultaneous operations (SIMOPS)			x		
Considerations for simultaneous operations involving DP and non-DP vessels			x		

Mission specific operations					
General considerations		x			x
Introduction to different mission types & available guidance		x			x
The mission - its interaction with DP redundancy concept (load limitation priorities, sharing of common supplies (eg power, cooling, ventilation), DP3 F&F integrity of mission equipment, draught changes (eg heavy lifts), wind profile, blocking of PRS signals		x			x
Reference systems & sensors (general considerations from a mission perspective)		x			x
Operational planning (general considerations from a mission perspective)		x			x
Dive support vessels		x			
General description/considerations - specific to mission		x			
Reference systems & sensors - specific to mission		x			
Operational considerations & planning - specific to mission		x			
Pipe lay/cable lay		x			
General description/considerations - specific to mission		x			
Reference systems & sensors - specific to mission		x			
Operational considerations & planning - specific to mission		x			
ROV support		x			
General description/considerations - specific to mission		x			
Reference systems & sensors - specific to mission		x			
Operational considerations & planning - specific to mission		x			
Heavy lift			x		
General description/considerations - specific to mission			x		
Reference systems & sensors - specific to mission			x		
Operational considerations & planning - specific to mission			x		
Float over			x		
General description/considerations - specific to mission			x		
Reference systems & sensors - specific to mission			x		
Operational considerations & planning - specific to mission			x		
Accommodation			x		
General description/considerations - specific to mission			x		
Reference systems & sensors - specific to mission			x		
Operational considerations & planning - specific to mission			x		

Drilling			x		
General description/considerations - specific to mission			x		
Reference systems & sensors - specific to mission			x		
Operational considerations & planning - specific to mission			x		
FPSO floating production storage and offloading unit				x	
General description/considerations - specific to mission				x	
Reference systems & sensors - specific to mission				x	
Operational considerations & planning - specific to mission				x	
Shuttle tankers		x			
General description/considerations - specific to mission		x			
Reference systems & sensors - specific to mission		x			
Operational considerations & planning - specific to mission		x			
Trenching				x	
General description/considerations - specific to mission				x	
Reference systems & sensors - specific to mission				x	
Operational considerations & planning - specific to mission				x	
Jack-up (self-elevating)					x
General description/considerations - specific to mission					x
Reference systems & sensors - specific to mission					x
Operational considerations & planning - specific to mission					x
Offshore support and anchor handling		x			
General description/considerations - specific to mission		x			
Reference systems & sensors - specific to mission		x			
Operational considerations & planning - specific to mission		x			
Well stimulation				x	
General description/considerations - specific to mission				x	
Reference systems & sensors - specific to mission				x	
Operational considerations & planning - specific to mission				x	
Rock placement					x
General description/considerations - specific to mission					x
Reference systems & sensors - specific to mission					x
Operational considerations & planning - specific to mission					x
Dredging				x	
General description/considerations - specific to mission				x	
Reference systems & sensors - specific to mission				x	
Operational considerations & planning - specific to mission				x	

SOV service operations vessels		x			
General description/considerations - specific to mission		x			
Reference systems & sensors - specific to mission		x			
Operational considerations & planning - specific to mission		x			
Practical exercises onboard and drills	x	x	x	x	x

The Nautical Institute

Annex L

DPVM Revalidation Course

February 2025 – Version 1

Disclaimer

While every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. Likewise, The Nautical Institute cannot be held responsible for any damage to property or personnel while following these guidelines. This information is produced in good faith, but The Nautical Institute cannot guarantee the accuracy and/or completeness of the information, which is produced for guidance purposes only.

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Document version control

NI DPVM Revalidation Course		
Title	**Version**	**Date**
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Table of changes

Page	Subject	Original content v1 (January 2025)	

Table of contents

1 Introduction

The Nautical Institute (The NI) has introduced an alternative route to revalidation through the implementation of a DPVM Revalidation Course. The requirements for the DPVM Revalidation Course are established through this document.

This document is to be read in conjunction with "Training and Certification Scheme for Key Technical DP personnel" (The DP Vessel Maintainer Course).

The contents of the DPVM Revalidation and the DPVM Refresher and Competency Assessment Courses are similar. The NI agreed to merge the course with DPVM Refresher and Competency Assessment Course. The single course will be known as the **DPVM Revalidation / DPVM Refresher and Competency Assessment Course.**

If a training centre is approved for the DPVM Revalidation course, it is also approved for the DPVM Refresher and Competency Assessment course. The training centre should amend the title of the course to:

DPVM Revalidation / DPVM Refresher and Competency Assessment Course

Training centres will not need to administer two separate sets of course materials.

DPVM Revalidation and DPVM Refresher and Competency Assessment course participants can attend the same course. It is the training centre's responsibility to ensure they meet the ratio of students as per the NI Standard and approporeat certificate is to be issued at the end of the course.

2 Minimum Entry Qualification Requirements

The minimum entry requirement is a DPVM Certificate issued by The NI. The original DPVM Certificate should be presented at the DP Centre where the DPVM Revalidation Course is completed.

The DPVM Revalidation Course may be completed up to twelve months before the revalidation date set by the NI. The course will be valid for a period of 12 months only, in which the DPVM must apply online to The NI.

If the participant is completing the course for the first time, there is no minimum DP sea time requirement.

If the participant is completing the course for a second or subsequent time, a minimum of 30 DP sea time days will be required to revalidate. This DP time may be completed prior to or after the Revalidation Course and before the DPVM expiry date.

Where a participant subsequently revalidates after taking the course by completion of the full sea time requirement of 150 DP sea time days, that participant can then take the Revalidation Course again without a DP sea time requirement.

3 Number of Hours

The course is conducted over five days with a minimum of 34 hours, which include theory instructions, practical exercises, a practical exam and an online exam.

This Annex also covers Instructor qualifications, extra simulator equipment required, course duration and practical assessment.

4 Ratio of Students/Instructors/Equipment

For classroom-based courses, the NI allows a maximum of eight students per class to be taught by one instructor. By exception and when justified, 12 students may be considered at the discretion of The Nautical Institute, based on Instructor's experience of the training methodology in place.

For online courses the NI allows a maximum of 6 students per class to be taught by one instructor. By exception and when justified, 8 students may be considered at the discretion of The Nautical Institute, based on the Instructor's experience of the training methodology in place.

5 The Role of the Nautical Institute

The Nautical Institute facilitates and administers the accreditation of dynamic positioning training centres and the training of DPOs and DPVMs as per the standard agreed by industry and flag administrations.

6 Accreditation to conduct the DPVM Revalidation Course

A Nautical Institute-approved DP training centre may apply for accreditation to conduct the DPVM Revalidation Course if the training centre fulfils the following criteria:

- It has an NI B-Class simulator
- It already holds approval to conduct DP courses
- It has an instructor that meets the requirements in this document

7 Revalidation

A. To revalidate a DPVM Certificate, in addition to 150 days of sea time or equivalent, a DPVM needs to:

- Pass an NI online DPVM Revalidation exam

  AND

  Undergo Continuing Professional Development (CPD)

  OR

  Complete an NI DPVM Refresher and Competency Assessment course

B. A DPVM with 30 days or more DP sea time may revalidate with the following option:

- NI DPVM Refresher and competency Assessment course

C. A DPVM with less than 30 days of DP sea time or less must complete The NI DPVM Revalidation Course. When revalidating using the Revalidation Course for a second or subsequent time, the DP technical staff must follow the rules as per the standard with respect to sea time requirements.

8 DPVM Revalidation course

Introduction

The Nautical Institute (The NI) has introduced an alternative route to revalidation through the implementation of a DPVM Revalidation Course. The requirements for the DPVM Revalidation Course are established through this document.This NI model course document is to be read in conjunction with:

A. The Nautical Institute Training and Certification Scheme For Key Technical DP Personnel (the DP Vessel Maintainer Course), named as DPVM in this document.
B. Nautical Institute Certification and Accreditation standard Vol.2 – (Accreditation) as updated each year.

Training centres or organisations that have developed training programmes that are compliant with NI DPVM Revalidation course requirements may apply for accreditation by The Nautical Institute for the course. When an organisation and its course are accredited, it will be authorised to issue certificates bearing the logo of The NI and to promote its course as being compliant with the standard of The NI.

Use of The NI DPVM model course

To use the model course effectively, instructors should review the course plan and detailed syllabus, considering the information on the entry standards specified in the course framework. The actual level of knowledge, skills and prior technical education of the trainees should be kept in mind during this review. Any areas within the detailed syllabus that may cause difficulties because of differences between the actual entry level of trainees and that assumed by the course designer should be identified. To compensate for such differences, all course material shall be sent to The NI for review.

Lesson plans

Training centres are to develop lesson plans based on the detailed teaching syllabus and specifications of simulators. Instructors should pay due attention to the trainees' backgrounds and previous knowledge when adjusting the course content to suit their knowledge and experience and advise of any revision of the course objectives required. The detailed teaching syllabus describes required performances that, together with the exercise scenarios, will be used to deliver the course.

Presentation

The presentation of concepts and methodologies should be repeated in various ways until instructors are satisfied that the trainees have attained each specific learning objective. The syllabus is laid out in learning-objective format and each objective specifies the performance required of the trainees to achieve the intended learning outcomes.

Implementation

For the course to run smoothly and to be effective, considerable attention should be paid to the availability and use of:

- Properly qualified instructors
- Technical and non-technical support staff
- Teaching and other spaces
- Appropriate training equipment and teaching aids
- Videos and multi-media presentations
- Textbooks, one-line drawing, appropriate technical papers and other relevant written material
- Minimum B-Class simulator approved by The Nautical Institute
- Extra simulator requirement for DPVM practical training
- Nautical Institute database of training materials

Course Framework Aim

To give the student the following:

- An understanding of the theoretical and practical operation of DP systems
- Technical understanding of the component parts of the DP and associated systems
- An understanding of the limitations of equipment and the effects of equipment failures
- An understanding of the limitations and the effects of incorrect operation of the systems
- An understanding of work that can safely be undertaken with and without the help of equipment manufacturers and, more importantly, when to stop before affecting the vessel's capability to perform DP operations or redundancy
- The ability to find faults in the DP system and its base components
- An understanding of Failure Modes and Effects Analysis (FMEA) and the philosophy of system redundancy
- An improved ability to operate the engine room and DP equipment in a safe and competent manner
- An understanding of MTS vessel design philosophy and MTS fundamentals
- An understanding of cross-connections and their effect on redundancy
- DP knowledge and vessel-specific and type-specific onboard equipment training

Scope

Seafarers responsible for designated dynamic positioning duties associated with the equipment's maintenance or use in emergency situations should have completed The NI Training for Key Technical Personnel (DP Vessel Maintainer) course for service on ships subject to Dynamic Positioning operations.

This course is essentially a course with practical guidance and information. It provides training and qualifications for engineers, engine officers and ETOs if part of the ship's technical team.

The course consists of theory and practical exercises structured around the safe operation of DP ships, DP classes, design of DP installations, propulsion machinery, auxiliary systems and power generation machinery.

Staff requirements & Instructor Qualifications

The course shall be conducted by an NI DP instructor who is approved and has conducted two DPVM courses.

The course may be delivered by one or two instructors.

The course shall have a suitably qualified ETO, Chief Engineer or DP Service Engineer to support training. If The NI instructor is an engineer or has good in-depth technical knowledge, then extra support may not be required subject to review by The Nautical Institute.

Teaching facilities and equipment

Suitable teaching spaces equipped with the relevant facilities should be provided to facilitate the effective delivery of training, which could be through lectures, group exercises and discussions, as appropriate.

Where the use of multi-media and simulation is intended, it should be ensured that appropriate multi-media equipment and simulators are made available.

The following items of equipment are recommended to enable the trainees to undergo practical exercises on a DP simulator that covers section B-V/f* from the STCW Code and the objective of this course:

- Audio-visual equipment and material
- Whiteboard, interactive whiteboard or flipchart for demonstrations
- Internet connection
- Minimum DP B-Class Simulator recognised by The Nautical Institute
- Extra simulator equipment as listed below
- Requirements of Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation), current version

Delivery Method

The course will be based on theory and NI B-Class simulators and will give the participant an overview of DP operation and the effects of system and component failures.

On completion of this course, participants will understand the general arrangements for DP systems and the principles of operation of the equipment. Participants will gain an understanding of the importance of the interaction between the system components and the modes of operation.

This course requires the ability to read and interpret ship drawings, typical product specifications, job sheets, procedures, material labels and safety information as provided. Writing is required to the level of completing workplace forms. The course shall be delivered in English.

Teaching aids

- Instructor manual
- Student manual
- Visual presentations
- Videos
- Drawings
- Samples of sensors

In addition, DP vessel drawings, or other means of demonstration of ship installations of systems for propulsion machinery and auxiliary power generation machinery, should be provided.

Other teaching aids:

- Multi-media training aids such as videos
- E-learning materials and computer-based training (CBT) only if approved by The Nautical Institute before being used for training
- The NI will provide technical support documentation to training schools via The NI website Training Provider
- Training FMEA, vessel drawings and product information. IMCA M117 (only) approved for use by the training centre
- MTS documents approved for use by the training centre

Use of Simulators

When using simulator-based training, instructors should ensure that the aims and objectives of these sessions are defined within the overall training programme and that tasks are selected to relate as closely as possible to shipboard tasks and practices.

Simulator Equipment Required

The minimum simulator requirement is an NI B-Class simulator in an accredited NI training centre. Course contents shall have an assortment of photos of real equipment and DP installations. Photos must cover all parts of a DP system, i.e.:

- Controller
- I/O units
- Optical isolators
- Switchboard
- Environmental sensors
- Position Reference Systems
- UPSs
- Network system

A computer is needed to display different types of serial string. This may be augmented if a real sensor is available.

Students should preferably be provided with real hardware and associated equipment, either operational or non-operational.

If a training centre does not have some of the simulator equipment or a screen to show I/O and other information on their simulator, then on a case-by-case basis the auditor will ensure the training notes cover the required course objectives.

Simulator exercises

- Demonstrate a problem with a command signal
- Demonstrate a problem with the feedback signal
- Demonstrate a thruster failing to achieve full thrust
- Demonstrate a reject problem with gyro and wind sensor
- Demonstrate a slow spread of the position reference system, then deselect one position reference system to show how a vessel can have a drive-off with all equipment working correctly
- Demonstrate a slow spread of position reference sensors until one position reference system is rejected by a median or prediction test
- Demonstrate the high loads caused if the set point speed is set too high

- Demonstrate the high load caused when changing heading when the centre of rotation is set away from the centre of the vessel
- Demonstrate having the bow into high wind and current, then turning the vessel 90 degrees and showing high load and loss of position
- Demonstrate if the DP is unstable
- Monitor the command and feedback value in mA on the DP operator screen
- Monitor input serial strings into the DP system on the operator screen if the string is simulated or use a computer program to generate a serial string

Safety routines

Safety precautions during DP drills are important during this course and affect the course structure. Trainees should always be protected from danger while the course is in progress. Training providers should always consider the training spaces, equipment, facilities available and the safety of trainees. During the course, especially during practical drills, trainees should strictly adhere to the safety rules laid down by the training provider.

All the equipment used for practical training should be properly maintained and approved by The Nautical Institute.

General Course Content and Competencies

The general course content and competencies comprise the following:

- General overview of DP
- The power system
- The thruster system
- Control systems and sensors
- Documentation
- DP operation and effects on the DP system
- Safe DP operation of CAM, ASOG, TAM and TAGOS
- Lessons learned
- Manning, training and competency assessment

Timetable

This NI course has been developed providing a recommended range in duration of 34 hours over five days for lectures, demonstrations or simulator exercises and NI online assessment and practical assessment. The training centre is to develop a formal timetable for a DPVM revalidation course.

Training centres must develop their own timetable depending on:

- The level of skill of trainees
- The number to be trained
- The number of instructors
- Simulator facilities and equipment
- Normal practices at the training centre

Course Outline

Review of The Nautical Institute DPVM Training Scheme:

- DP hardware and integration with other ship's systems
- DP software, alarms and position control
- Power system and thruster systems
- Planned maintenance of DP and associated systems and when to call a service technician
- Documentation, DP equipment, Class, IMCA and MTS
- Manning, training and competency assessment
- Safe DP operations
- Essential non-DP Systems – safety systems
- Future trends including automation and integrated bridge management systems
- Simulator exercises

The course comprises lectures, demonstrations and simulation exercises. The outline below identifies the main areas of the course.

A learning objective format is used in the detailed teaching syllabus given in Part C. The outline below is a summary of the course material. The numbering system used below reflects that of the detailed teaching syllabus.

Evaluation and Assessment

The effectiveness of any evaluation depends largely on the precision of the description of what is to be evaluated. The detailed teaching syllabus is thus designed to assist the instructors, with descriptive verbs, mostly taken from the widely used ***Bloom's Taxonomy***. Evaluation and Assessment are ways of finding out if learning has taken place. They enable the assessor (instructor) to ascertain if the trainees have gained the required skills and knowledge needed at a given point to effectively demonstrate their competence to perform the tasks set out.

Assessment

In assessing the achievement of competences in section B-V/f* from the STCW Code, assessors should be guided by the criteria for evaluating competences.

Online Assessment

To revalidate the DPVM certificate, the holder must pass an NI online assessment at the training centre or an NI remote exam. The exam is composed of multiple-choice questions and shall be completed within 90 minutes. The online assessment will consist of 40 questions and shall be completed with a pass mark of 70%.

Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt.

After failing three initial attempts, the student is required to repeat the DP Vessel Maintainer revalidation course and undertake the assessment again.

Practical Assessment

Candidates will also be required to undertake a practical assessment administered by the centre. The following are to be part of a practice exam on the B-Class simulator. Using the DP system display:

- Identify a thruster pitch feedback or rpm error
- Identify a thruster command error
- Identify a position reference system fault, failure or degradation
- Identify a sensor fault or failure
- Identify a power plant configuration where the redundancy concept could be defeated

- Identify a scenario where the vessel is being operated beyond its redundant limits so the WCFDI is defeated
- Identify an alternative thruster or power configuration (thruster or generator not available) and determine whether the redundancy concept is intact or defeated. Can operations be conducted?
- Describe actions with reference to ASOG/CAMO/TAM in response to an equipment status change

Detailed Outline

This correlates the knowledge, understanding and proficiencies defined in the STCW Code and IMCA 117, with the specific learning outcomes that the trainees should achieve. Each specific outcome is presented as a topic or sub-topic as a learning objective reflecting the knowledge, understanding and proficiency in section B- V/f* from the STCW Code.

9 Detailed Learning objectives

The following detailed course contents will allow all training to cover the same objective. The course content is large but many points can be covered by a small paragraph in the PowerPoints.

1	**Course contents and Competencies in Detail to be part of The NI's training centre model course DP Vessel Maintainer**
1.1	The following list of competencies are in detail to ensure that all training centres cover the same contents. Many of the items are just one statement on a PowerPoint. The numbering is based on the current number for DP Knowledge for Technical staff. **The Nautical Institute will supply training centres with an FMEA study and FMEA proving trial, and IMCA, MTS and OCIMF documents on which to base some of their training.**
2	**Brief history of DP system development**
2.1	Development of DP systems and what is needed for offshore drilling
2.2	Brief discussion on the way DP is used
3	**Reasons why DP is used extensively: client requirements, safety, etc**
3.1	When water is too deep for anchors
3.2	Removes the need to make fast to offshore installations and improves safety for crews
3.3	Quick deployment at a new location of any type of vessel
3.4	It is increasingly difficult to manually operate multi-thruster vessels
3.5	Provides a stable platform for crane ops, gangway ops, ROV ops, etc

4	**Types of DP vessel**
4.1	Course to briefly discuss the types of DP vessel and their uses. OSVs, drilling units, construction vessels, dive vessels, pipelay vessels, wind-farm vessels, passenger vessels. Describe types of thruster fitted.
5	**Theory of DP control: Explanation of how the system positions the vessel; Heading; Feedback; Wind; Modelling, Kalman filter, controllers and DP current, etc**
5.1	Be able to discuss briefly the main elements of a DP system, DP computer/controller, thruster and propulsion, power systems, position reference and environmental sensors
5.2	Describe why the DP system requires a wind input
5.3	Describe why the DP system requires a heading input
5.4	Describe why the DP system requires an input for roll, pitch and possibly heave
5.5	Describe full joystick mode
5.6	Describe joystick auto-heading mode
5.7	Describe two-axis control
5.8	Describe full three-axis control
5.9	Describe the difference between DP joystick, remote joystick and independent joystick
5.10	Describe modelling
5.11	Describe the function of Kalman filters
5.12	Describe how DP current is calculated
6	**DP equipment classes as defined in IMO guidelines and classification society rules**
6.1	Describe Class 1, Class 2 and Class 3 DP vessels
6.2	Describe enhanced notation
6.3	Review DP system generic one-line drawing for Class 1, 2 and 3 vessels
6.4	Describe redundancy
6.5	Describe worst-case failure (WCF) in terms of redundancy
6.6	Describe loss of redundancy affecting class of the vessel
6.7	Describe the overuse of power and the effect on WCF redundancy
6.8	Describe what class of vessel is best suited for each industry mission
6.9	Describe consequence analysis alarm and requirement for the use during Class 2 and 3 operation
6.10	Describe what would trigger a consequence analysis alarm
7	**Typical elements of a generic DP system**
7.1	Describe the function of controllers
7.2	Describe the function serial input
7.3	Describe the function analogue and digital input and output
7.4	Describe the function network system
7.5	Describe the function power supplies
8	**The power system**
8.1	All components and systems necessary to supply the DP system with power. The power system includes:

9	**Fuel systems**
9.1	Describe a generic redundant-fuel system
9.2	Describe potential failures and associated impact on DP class
9.3	Describe how contaminated fuel can affect redundancy
9.4	Describe how the cross connection of a fuel system will defeat redundancy
9.5	Describe the effects of inadvertent operation of fuel tank quick-closing valves
10	**Cooling systems, fresh and sea water**
10.1	Describe a generic redundant cooling system for fresh and sea water
10.2	Describe the impact of system failures on DP class
10.3	Describe cooling pipework separation required for Class 3 redundancy
10.4	Describe the requirement to keep plate coolers and sea strainers clean and the effects of overheating. Overheating will lead to a reduction of power available and affect redundancy.
10.5	Describe the use of two sea suction valves in a system
10.6	Describe the effect of weed and jellyfish blocking sea suctions
10.7	Describe the effect of a ballast pump if connected to the same seawater system suction as the cooling system
10.8	Describe the use of antifouling system requirements in seawater systems
11	**Compressed air system**
11.1	Describe the layout of a typical redundant compressed-air system
11.2	Describe the possible effects of compressed-air failure on DP operations
11.3	Describe precautions with sharing ship's compressed air with on-deck industry mission equipment
12	**Ventilation system**
12.1	Describe layout of a redundant engine room ventilation system
12.2	Describe the possible effects of inadvertent closure of ventilation dampers during DP operation
12.3	Describe possible effects of gas detection and fire detection equipment on ventilation systems
13	**HVAC**
13.1	Describe layout of HVAC systems for redundant equipment operation
13.2	Describe the effect that loss of HVAC to engine rooms, equipment rooms, switchboard rooms, control rooms and bridge could have on the DP system
14	**Lubrication system**
14.1	Describe a typical layout of a redundant lubrication system for an engine
14.2	Describe a typical layout of a redundant lubrication system for a propulsion system
14.3	Describe the importance of a pre-lubrication system on a standby generator engine to allow quick start-up
14.4	Describe the consequence of loss of lubrication system for thrusters, CPPs and gearboxes
14.5	Describe the importance of oil sampling and testing as part of the maintenance routines

15	**Main engines**
15.1	Describe a typical generation plant layout and redundant power generation arrangements. Describe both full diesel-electric and direct-drive main thrusters
16	**Main switchboard**
16.1	Discuss the generated voltage options and limitations with regard to main switchboard short-circuit design
16.2	Describe a typical layout and functionality of a redundant switchboard for a diesel-electric power plant
16.3	Describe interlocks on main switchboards
16.4	Describe potential failures and the impact on DP class
16.5	Describe switchboard protection systems
16.6	Describe the term "designed to test"
16.7	Describe a problem with the main switchboard, under and over voltage, under- and over-cycles, short circuits
16.8	Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip
16.9	Describe why you would have thermal imaging conducted on switchboards on DP vessels
16.10	Describe the function of automatic change-over systems
16.11	Discuss the problems with connecting mission equipment to a redundant main switchboard
16.12	Discuss DC main switchboard concepts
16.13	Discuss monitoring equipment on the main switchboard
16.14	Discuss the energy storage system: connections with switchboards, maximum power usage, battery safety
17	**Generators**
17.1	Describe typical arrangements on a DP2 vessel
17.2	Describe spinning reserve and power available
17.3	Discuss the arrangements required to ensure that redundancy remains in place and what factors influence redundancy
17.4	Describe the use of standby generators and at what load a generator should auto-start
17.5	Describe the reason to disable auto-stop on low load when on DP
17.6	Describe how the use of more than 45% utilisation can affect redundancy
17.7	Describe how the electrical power available will affect thruster output
17.8	Describe how the electrical power available will affect the vessel capability plot
17.9	Describe load shedding
17.10	Be able to discuss a one-line electrical drawing
17.11	Describe how generator monitoring systems are different from power management systems
17.12	Describe the AVR control base principle and the result of AVR failure
17.13	Describe the typical plant layout for a diesel-electric DP vessel and compare the layout with a conventional vessel with twin CP propellers. Discuss the advantages and disadvantages of both systems.
17.14	Describe engine shutdown and protection systems

18	**Bus-tie requirements of IMO/class/FMEA**
18.1	Describe open and closed bus tie as per IMO 645/IMO 1580
18.2	Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip
18.3	Describe how open bus tie can ensure that a fault on one switchboard will not affect another switchboard
18.4	Describe with an example how the main bus-tie breaker and all other breakers are set up as per FMEA
18.5	Describe the benefit of closed bus tie systems
18.6	Explain that after WCF on a closed bus tie system the bus tie is to remain open if tripped during WCF until the fault is found
18.7	Describe breaker selective study, fault ride-through and explain that the main bus tie is to open before the generator breakers
18.8	Discuss new requirements for testing of bus tie breakers
19	**Electrical systems and cabling communications**
19.1	Describe the function of an Uninterrupted Power Supply (UPS)
19.2	Describe a typical UPS arrangement for DP2 and DP3 operations
19.3	Describe how to operate the bypass of a UPS
19.4	Describe test requirements for a UPS
19.5	Describe typical alarms from a UPS
19.6	Describe maintenance and life of UPS batteries
20	**AC supplies**
20.1	Identify on a one-line drawing the redundancy set-up and ensure there are no cross-connections
20.2	Identify what is connected to the AC circuits and possible loads
20.3	Describe a typical one-line diagram for distribution and supply of AC circuits on a DP vessel
20.4	Identify what is connected to the AC circuits and which are critical to DP operations
20.5	Explain that all sub-tie-breakers need to stay open regardless of whether the main tie breaker is open or closed
20.6	Discuss circuit protection and fuses
20.7	Discuss testing of auto-standby circuits for pumps, steering etc
21	**DC supplies**
21.1	Describe a typical 24V DC redundant supply one-line diagram.
21.2	Describe the various arrangements for backup supplies to engine control systems and switchboards.
21.3	Describe the risk of cross connections in 24V supplies.
21.4	Describe the problem of earth faults on two redundant systems and the use of DC/DC isolated supplies
21.5	Discuss the importance of clearing DC earth faults promptly for safe operation
21.6	Describe procedures for testing and maintenance of battery backup systems
21.7	Describe what could happen if there is a loss of charging power
21.8	Describe typical alarms from 24V DC systems

22	**Digital interference**
22.1	Describe a typical digital interface arrangement to a DP controller
22.2	Describe why a digital input is required by a DP controller and what system inputs normally use this type of input
22.3	Describe how a digital signal may be transmitted over a network from a remote I/O station
22.4	Discuss fail-safe modes for digital signals and networks
22.5	Describe the loss of redundancy upon failure of one multi-channel interface unit (I/O) with input connected signal from two different redundancy groups
22.6	Discuss testing of digital signals
23	**Analogue interface**
23.1	Describe the different analogue signals associated with DP control systems and their use
23.2	Describe the benefit of 4-20 mA signals for control and feedback of thrusters and main drives
23.3	Discuss testing of analogue signals
24	**Serial interface**
24.1	Describe the concept of serial data transmission and its use in DP control systems. What is NMEA?
24.2	Describe the various types of serial connection, RS232 & RS422
24.3	Describe the different types of NMEA protocol sentence formats and how to read them
24.4	Describe how to monitor NMEA string using the DP display, laptop or meter
24.5	Describe a simple check for NMEA string data errors
24.6	Describe the benefit of using RS422 serial connections over RS232
24.7	Discuss serial isolators and serial signal convertors
24.8	Discuss cable requirements for interconnection of serial units
24.9	Discuss or show examples on different NMEA strings (such as GNSS, wind, gyro)
24.10	Describe the purpose and use of optical isolator units
25	**Network systems**
25.1	Network layout for DP system
25.2	Network storm
25.3	Network testing
26	**Power management system custom systems and IMO DP equipment Class 2/3 requirements**
26.1	Maintaining continuity of electrical power under all defined load and failure conditions
26.2	General system functions
26.3	Describe typical power management systems for a DP vessel
26.4	Describe why a breaker selective study is required and its importance
26.5	Describe the difference between DP power limiting and generator power management
26.6	Explain why to disable a load-dependent stop while in DP mode
26.7	Describe a generator monitoring system and the important information it supplies

27	**Extra loads on switchboard with different operation, drilling, ROV etc**
27.1	Describe the need for a new load balance study when connecting extra equipment, such as an ROV
27.2	Describe the possible reduced power to thrusters
27.3	Describe the possible effect on the vessel's capability plot
27.4	Describe the problem of supply from only one switchboard and the loss of the switchboard
27.5	Describe how, when a piece of equipment fails, the fault transfers to the switchboard that caused a blackout
27.6	Explain load balance study
27.7	Explain what the term "designed to test" means
27.8	Describe auto blackout recovery
27.9	Describe load-dependent start and explain that the vessel could have passed the WCF load before the extra generator starts
27.10	Discuss why there may be different parameters in the PMS for DP operation and sea mode
27.11	Discuss system failures that can affect the operation of the PMS and the backup operating modes that are available
27.12	Discuss advanced generator supervisory systems and their independent operation from the PMS
27.13	Describe the extra redundancy required for working 'drift-on'
27.14	Explain the need for more spinning reserve when working 'drift-on'
28	**Cabling**
28.1	Describe the need to keep cables away from heat, including exhaust flow
28.2	Describe the physical cable routeing for Class 3 vessels as per IMO 645/1580 and classification society requirements
28.3	Describe the importance of separation between power cables and control and data cables
28.4	Discuss use of separate cable trays and physical routeing to maintain redundancy
28.5	Describe the use and grounding arrangements for screened signal cables
28.6	Describe the problem of replacing cables with the wrong type, not twist pairs
28.7	Describe the problem of network cable near radio transmitters
28.8	Discuss the use of fibre-optic cable and its advantages over conventional types
29	**The thruster system**
29.1	Describe the components and systems necessary to supply the DP system with thrust force and direction. These include azimuth thrusters, tunnel thrusters, propellers and other systems.
30	**Thruster control concepts**
30.1	Describe how a DP system is typically connected to a thruster control system, including normal control and backup control (on thruster control system)
30.2	Describe how emergency operation of thrusters will affect the DP control of the thrusters
31	**Thruster redundancy**
31.1	Describe thruster supply change-over
31.2	Describe how changing over a thruster that has failed could transfer the fault to a second redundancy group

32	**Thruster failure modes**
32.1	Describe "Fail as set"
32.2	Describe "Fail to zero"
32.3	Describe "Fail to full"
32.4	Describe why you would lose the ready signal.
32.5	Explain that emergency stops will still work when vessel is in DP control
32.6	Describe the effect on the DP system of a failed thruster
32.7	Describe the counterbalance effect of other thrusters when a thruster fails and the vessel is left in full auto DP mode
32.8	Describe thruster control by IP over ethernet and troubleshooting
33	**Azimuth thrusters, tunnel thrusters, propellers and other systems**
33.1	Describe standard fixed-pitch propeller advantages and disadvantages
33.2	Describe standard CPP advantages and disadvantages
33.3	Describe tunnel thruster advantages and disadvantages
33.4	Describe drop-down and fixed-in-position azimuth thrusters
33.5	Describe fixed pitch thrusters' advantages and disadvantages
33.6	Describe CPP azimuthing thruster advantages and disadvantages
33.7	Describe flap/Becker rudders and their advantages and disadvantages
33.8	Describe fishtail rudders and their advantages and disadvantages
33.9	Describe propeller nozzles and their advantages and disadvantages
33.10	Describe variable-frequency drives and their advantages and disadvantages
33.11	Describe direct-drive and its advantages and disadvantages
33.12	Describe constant-speed RPM motors for CPP thrusters and their advantages and disadvantages
34	**Thruster control concepts**
34.1	The following objectives (34.2–34.10) address the components and systems necessary to supply the DP system with thrust force and direction.
34.2	Describe the thruster-ready signal and what parameters are required for it to be present
34.3	Describe auto start-up of thrusters and auto selection into the DP system if a full blackout auto recovery system is fitted. Recovery system is programmed into the power management system.
34.4	Describe command and feedback signals (mA and V) and explain which one is better
34.5	Describe emergency stop on a thruster
34.6	Describe wire-break monitoring
34.7	Describe remote I/O concepts used in a thruster-control network or can bus systems
34.8	Describe backup redundancy on control systems
34.9	Describe typical alarms on thruster controls and DP systems
34.10	Describe testing of thruster signals for DP trials

35	**Thruster redundancy**
35.1	Describe typical thruster main power supply systems for redundancy
35.2	Describe typical backup hydraulic pumps, steering motors, cooling pumps, filters, cooling systems and fans fitted to rudder and thruster systems
36	**Thruster failure modes**
36.1	Describe what would indicate the following on a DP system: fail as set, fail to zero, fail to full, loss of ready signal
36.2	Describe a hydraulic problem with CPP thrusters
36.3	Explain how a thruster could always have a mechanical problem
37	**Control systems and sensors**
37.1	Overview of control system, software and sensors
38	**DP operator workstation**
38.1	Describe a typical operator workstation and the various hardware components
38.2	Describe the management for changing software
38.3	Explain that the DP system must be fully tested to check operation after a software upgrade
38.4	Describe typical maintenance and testing that should be carried out on a workstation
38.5	Describe a typical procedure for total shutdown and re-starting of a DP control system
38.6	Discuss how to download log files for analysis
39	**Control processor(s)**
39.1	Describe the function of the control processor in the DP control system
39.2	Describe the redundant design incorporated into the control system
39.3	Describe the redundant interconnections between the control processor and the I/O units
39.4	Describe how a failure on a DP controller is typically handled to maintain position-keeping
39.5	Explain how some DP systems use a Programmable Logic Controller (PLC) as part of the control system
40	**Independent joystick system (IJS)**
40.1	Independent joystick system (IJS)
40.2	Describe the difference between IJS and portable/wing joysticks
40.3	Describe the class requirement for IJS
40.4	Explain how on some older vessels the IJS can use the same controllers
40.5	Describe how a IJS is powered
40.6	Describe which DP sensors and references are also typically used for the IJS
41	**Changeover switch, manual controls/DP/joystick**
41.1	Describe the design of a typical change-over switch as a multi-gang switch on a single operating spindle and how these are not electrically connected
41.2	Explain that a common change-over switch removes the ready signal from the thruster to a DP system
41.3	Describe the changeover switch in a network thruster control system

41.4	Describe wire break monitoring on emergency change-over from DP to manual and on a DP-to-manual network control system
41.5	Describe wire break monitoring on emergency change-over from DP to manual and on a DP-to-manual network control system
41.6	Explain that the emergency stop and backup/emergency controls will still work with a changeover switch set to manual or DP or IJS mode
42	**DP software**
42.1	Describe the six degrees of freedom and which of these the DP system controls
42.2	Describe a hydrodynamic model
42.3	Describe an aeronautical model
42.4	Describe a DP mathematical model and PID control loop
42.5	Describe DP current
42.6	Describe an error affecting the DP current
42.7	Explain why the mathematical model can become unstable
42.8	Describe auto swap on the operator station and controllers and class rules about swapping
42.9	Describe DP modes
42.10	Describe backup copy and reloading program, following manufacturers' instructions
43	**Alarms**
43.1	Describe the need to set alarms to warn at an early stage
43.2	Explain that the DPO and engineer must understand what the alarm is and what caused it
43.3	Describe how to find information about an alarm in vessel documents and on-screen help
44	**Position reference systems: hardware, software and sensors**
44.1	Explain why position reference systems are used by the DP program
44.2	Describe the minimum number of position reference systems required to meet Class 1, 2 and 3
44.3	Describe position reference system voting
44.4	Describe the difference between 'fixed' and 'mobile' relative position reference systems
44.5	Describe what happens when all position reference systems are lost from the DP system
45	**GNSS / DGNSS**
45.1	Describe the principle of GNSS systems
45.2	Describe DGNSS and the use of correction to improve the quality of a position fix
45.3	Describe the different ways DGNSS corrections are received
45.4	Describe the disadvantages of the DGNSS system
45.5	Describe the advantages of the DGNSS system
45.6	Describe the use of INS to improve the reliability of position
45.7	Describe how to identify an antenna problem
45.8	Describe the blocking of a correction signal
45.9	Describe the azimuth and elevation of a corrections satellite

45.10	Describe failure modes
45.11	Describe maintenance and logical fault-finding
45.12	Describe jamming and spoofing of DGNSS systems
46	**Acoustic**
46.1	Describe the principle of an acoustic system
46.2	Explain why the speed of sound through the water is required
46.3	Describe its advantages
46.4	Describe its disadvantages
46.5	Describe its failure modes
46.6	Describe its maintenance and logical fault-finding
47	**Taut wire**
47.1	Describe the principle of a taut wire system
47.2	Describe its advantages
47.3	Describe its disadvantages
47.4	Describe its failure modes
47.5	Describe its maintenance and logical fault-finding
48	**Laser – system**
48.1	Describe the principle of a CyScan system
48.2	Describe its advantages
48.3	Describe its disadvantages
48.4	Describe its failure modes
48.5	Describe its maintenance and logical fault-finding
48.6	Describe the different types of laser target, use and maintenance
48.7	Describe CyScan AS targets
48.8	Describe a SceneScan targetless laser system
49	**Microwave – systems, short- and long-range**
49.1	Describe the principle of a RadaScan, Radius or Artemis system
49.2	Describe the positioning of interrogator units
49.3	Describe the advantages of microwave systems
49.4	Describe the disadvantages of microwave systems
49.5	Describe their failure modes
49.6	Describe their maintenance and logical fault-finding
49.7	Describe their transponders and battery maintenance requirements
50	**Inertial navigation systems**
50.1	Inertial navigation systems
50.2	Describe their advantages
50.3	Describe their disadvantages

50.4	Describe how INS is used with DGNSS and hydro acoustic systems
50.5	Describe their failure modes
50.6	Describe their maintenance and logical fault-finding
51	**DP sensor systems**
52	**Gyro**
52.1	Describe the principle of a standard gyro compass
52.2	Describe the principle of a fibre optic gyro compass
52.3	Describe its failure modes
52.4	Describe why a gyro might need to be set to manual speed and latitude
52.5	Describe its maintenance and logical fault-finding
53	**Environment sensors – MRU/VRU**
53.1	Describe the principle of a VRS/VRU
53.2	Describe why a DP system needs an MRU/VRS input
53.3	Describe its failure modes
53.4	Describe the maintenance logical fault-finding and calibration required
53.5	Explain that some MRU/VRS have internal batteries
54	**Environment sensors – wind sensor**
54.1	Describe the principle of propeller and ultrasonic wind sensors
54.2	Describe wind feed forward
54.3	Describe the effect on DP from wind sensor outputting too high a speed and its effect on the model
54.4	Describe the effect on DP from wind senor outputting too low a speed and its effects on the DP model
54.5	Describe the advantages and disadvantages of sensor types
54.6	Describe maintenance and logical fault finding
54.7	Describe simple checks, e.g. flags or obstructions
54.8	Describe problems arising from poor positioning of wind sensors
55	**Peripherals**
56	**Printer**
56.1	Describe the DP printer and the need for it to be online during DP operations
56.2	Discuss DP data loggers as independent to the DP system, can replace as long as you can print alarms
56.3	Discuss how to download log files for analysis
57	**Documentation**
58	**DP manual**
58.1	Explain that every DP vessel must have a DP manual that outlines DP operations, company DP policy, onboard documents, training and vessel hardware. Some classification societies require the DP manual to be class-reviewed.

59	**FMEA**
59.1	Explain what FMEA stands for
59.2	Explain why an FMEA is required and the legislation associated with FMEA
59.3	Describe what is contained in the two main sections of an FMEA
59.4	Describe the content of the vessel study
59.5	Describe the process of developing an FMEA and the international guidelines that are recommended
59.6	Describe the overall contents of the proving trials section
59.7	Describe the meanings of A, B and C findings
59.8	Describe the requirement for FMEA to be class-approved
59.9	Describe what WCFDI is and why is it important
59.10	Describe how to conduct FMEA trials safely
59.11	Explain why a copy of the FMEA must be in the engine room and control room
59.12	Discuss an actual Vessel FMEA to illustrate the process of redundant system review
59.13	Describe actions to take if errors are found in an FMEA
59.14	Describe the use of FMEA functional description and block diagrams for fault finding and tracing of faults
60	**DP annual trials**
60.1	Annual trials as per IMO 1580 and IMCA M 190
60.2	Explain why CPP and thruster wire breaks need to be tested every year
60.3	Explain that the redundancy group is to be tested each year
61	**Capability plots**
61.1	Explain what a capability plot is
61.2	Describe the capability plot for WCF
61.3	Describe the difference between a capability plot and a footprint plot
61.4	Explain why a footprint plot cannot be used to check a capability plot
61.5	Describe the errors that can occur within capability plots
61.6	Explain how to use a max thruster limit of 45% utilisation to safeguard against error in capability plots
61.7	Describe an online capability plot
61.8	Explain why reducing the number of generators and power available can affect the capability plot
62	**Management of Change Procedures**
62.1	Explain what is meant by management of change
62.2	Explain why management of change is important
62.3	Describe what management of change is required for changes of hardware, software, FMEA
63	**System and equipment manuals**
63.1	Discuss the importance of having a full set of operating and maintenance manuals for all DP related systems

63.2	Discuss the importance of having a full set of up-to-date 'as-built' technical drawings for the vessel
63.3	Discuss the use and development of bridge and engine room DP checklists
64	**Hazards**
64.1	Explain the importance of not carrying out unauthorised maintenance during any DP operation and permit to work
64.2	Describe managing risk during reinstatement of equipment
65	**Incident reporting – IMCA and MTS schemes**
65.1	Discuss incident reporting forms for IMCA and MTS
65.2	Discuss recent and relevant incident reports
66	**Planned maintenance system**
66.1	Discuss the importance of an effective planned preventative maintenance system for all machinery and equipment related to DP
66.2	Discuss the importance of maintaining good record keeping and equipment histories
66.3	Discuss the importance of record keeping of service reports and technical bulletins relating to the DP equipment
66.4	Describe the process and responsibilities of planning maintenance activities that may affect DP operations
66.5	Discuss the requirements to carry critical spares for all DP equipment
67	**Documentation**
67.1	IMO Documents
67.1.1	Describe IMO 645 and IMO 1580
67.1.2	Describe IMO 738 and its links to IMCA 117
67.2	OCIMF – Oil Companies International Marine Forum
67.2.1	DP Failure Mode Effects Analysis Assurance Framework Risk-Based Guidance
68	**Use of IMO 645/1580 by Class, IMCA and MTS**
68.1	Discuss class use of IMO 645/1580 and IMCA/MTS documents to formulate class rules
69	**MTS Documents available and what they contain**
69.1	MTS Design Philosophy
69.1.1	Offshore Tech Guidance DP-classed vessels with closed bus-tie(s)
69.1.2	DP Vessel Design Philosophy Guidance Part 1
69.1.3	DP Vessel Design Philosophy Guidance Part 2
69.2	MTS DP Operation Guidance
69.2.1	DP Guidance Part 2, Appendix 3 Logistics
69.2.3	DP Guidelines on Testing of DP Systems
69.2.4	DP Tech Committee DP Operations Guidance Part 1
69.3	MTS tech ops
69.3.1	Techop annual DP trials and gap analysis
69.3.2	Techop FMEA gap analysis

69.3.3	Techop FMEA testing
69.3.4	Cross connections
69.3.5	All other tech ops
70	**IMCA documents available and what they contain**
70.1	IMCA M103 – The design & operation of DP vessels
70.2	IMCA M109 – DP-related documentation for DP vessels
70.3	IMCA M117 – Code of practice for the training & experience of key DP personnel, August 2023
70.4	IMCA M125 – Safety interface document for a DP vessel working near an offshore platform
70.5	IMCA M140 – Specification for DP capability plots
70.6	IMCA M163 – Guidelines for quality assurance & quality control of software
70.7	IMCA M166 – Guidance on FMEA
70.8	IMCA M182 – MSF International Guidelines for the Safe Operation of DP OSV
70.8	IMCA M190 – Guidance for developing and conducting DP annual trials programmes
70.10	IMCA M206 – A guide to DP electrical power and control systems
70.11	IMCA M220 – Guidance on Operational Activity Planning
70.12	IMCA M244 – Guidance On Vessel USBL Systems For Use In Offshore Survey, Positioning And DP operations
70.13	IMCA M247 – Identify DP system components and their failure modes
70.14	IMCA M252 – Guidance on position reference systems and sensors for DP operations
71	**Manning, training and DP emergency drills**
71.1	Describe engine room manning and watchkeeping principles for DP operations
71.2	Describe requirements for good communication between bridge and engine room at all times
71.3	Describe the use of checklists and the need to promptly report to bridge any changes in operational status
71.4	Describe the need to keep the Chief Engineer updated with any operational problems
71.5	Describe the operation of the status alert system
71.6	Explain the requirement for comprehensive engine room standing orders
71.7	Explain the requirement for a comprehensive handover during change of watchkeepers
71.8	Describe the planning of onboard drills, real and desktop
71.9	Describe the use of 'mobilisation' and 'start of project' DP trials to ensure system operational readiness
71.10	Describe the development of standard engine room DP procedures for a vessel
71.11	Explain the need for performing DP drills and their different types
71.12	Describe how to conduct a partial blackout drill
71.13	Describe how to conduct a full blackout drill
71.14	Describe how to conduct a drill for a broken fuel line
71.15	Describe how to conduct a drill for a broken cooling pipe
71.16	Describe how to conduct a fire drill when on DP

72	**DP operation and effects on DP system**
73	**ASOG – principle, layout and use of activity-specific operational guidelines**
73.1	Describe IMCA 220 and MTS Tech Ops documents outline of ASOG in detail
73.2	Describe the ASOG list of how the vessel equipment is set up for the current industry mission
73.3	Explain how ASOG should match the FMEA
73.4	Explain how ASOG will state what action to take after a failure
73.5	Explain why ASOG needs to be approved by charterer, shore management and vessel
73.6	Describe how the ASOG can be used as a decision-making tool after a failure
73.7	Describe how the ASOG is used for the safe set-up of DP vessel
73.8	Explain that the ASOG is the bridging document between the vessel and charterer and how the DPO must have their vessel set-up and operational limits
73.9	Describe the alignment of the alert light system and ASOG
73.10	Describe how the ASOG/CAM is used to reduce risk.
73.11	Explain why the CAMO must match class-approved FMEA
73.12	Describe the use of 'status light' systems on DP vessels
73.13	Explain how the ASOG/CAMO is a bridge document between vessel documentation and charterer working limits and equipment set-up requirements
74	**CAMO – principle and layout of critical activity mode of operation**
74.1	Explain how IMCA 220 and MTS Tech Ops documents outline CAMO in detail
74.2	Explain how CAMO mode set is set up as a redundancy mode of operation
74.3	Describe how the CAMO must match the vessel's FMEA
75	**TAM – principle and layout of task-appropriate mode**
75.1	Describe the IMCA 220 and MTS Tech Ops documents outline TAM in detail
75.2	Explain how the TAM requirement could be less than required by the FMEA and after a failure the vessel could have a loss of position
75.3	Explain how the TAM requirement could be less than required by the FMEA and after a failure the vessel could have a loss of position
76	**TAGOS – principle and layout of thruster and generator operating strategy**
76.1	Describe how the TAGOS can be used to list what combination of generators can be online, setting of all tie breakers and maximum percentage of load used
76.2	Describe the TAGOS arrangements
77	**Limitations of different types of DP operation**
77.1	Explain how the mode of operation will depend on the modes supplied with DP system
77.2	Explain why a DP vessel cannot be used for anchor handling unless a tow-winch tension meter is connected to the DP and describe the problem if the tension meter fails
78	**SIMOPS**
78.1	Describe limitations and extra redundancy required when a vessel is in close proximity and experiences drift-on

78.2	Explain why extra redundancy and generators may be requested by the DPO in a high-risk drift-on
78.3	Explain why at times the main watchkeeping engineer might need to stay in the control room
78.4	Describe how a vessel can be affected by thruster wash from other vessels
78.5	Describe how working in close proximity to other vessels might limit the options for manoeuvring the vessel in event of a failure
79	**Operating in open water**
79.1	Describe how in open water the vessel (ROV/Bell) might be 'drift-on' to a subsea asset
79.2	Describe which position reference system will not work in open water
80	**Possible effects of subsea operation on DP vessels**
80.1	Describe the effect of underwater current on drilling risers, Lars, tether and of the ROV leading force on DP
80.2	Describe the risks of launch and recovery operations
80.3	Describe the danger of a tether becoming entangled in thrusters
81	**Possible effects of remote access**
81.1	Describe using remote diagnostics and the danger of use during DP
81.2	Describe the potential damage of cross connecting a network system and cyber attack
82	**Lessons learned**
82.1	Describe common causes of DP incidents based on past incident case studies
82.2	Review IMCA DP incident flowcharts
82.3	Review various published incident reports (IMCA, MTS, US Coast Guard)
83	**Information required when reporting system problems**
83.1	Describe what information is required for remote diagnostics, where to find it and how t o communicate
83.2	Describe common methods of copying system log files from the operator station computer for fault analysis by the equipment maker
83.3	Describe the use of screen shots and photos of the equipment to aid fault-finding, supported by copies of the alarm printouts of both DP and machinery alarms taken when the fault occurred
83.4	Discuss the importance of maintaining records of correspondence of any fault with the equipment maker's service department and including all relevant company technical and operations departments in the correspondence
83.5	Discuss the trend in remote access via satellite link of some equipment makers. Highlight the security risks of this type of arrangement.

The Nautical Institute

Annex M

DP Vessel Maintainer Refresher and
Competency Assessment Course

February 2025 – Version 1

Disclaimer

While every effort has been made to ensure that all the information in this document is updated and correct, The Nautical Institute cannot be held responsible for any loss, financial or otherwise, direct or indirect, resulting from use of this information. Likewise, The Nautical Institute cannot be held responsible for any damage to property or personnel while following these guidelines. This information is produced in good faith, but The Nautical Institute cannot guarantee the accuracy and/or completeness of the information, which is produced for guidance purposes only.

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NI DPVM Refresher and Competency Assessment Course		
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The DP Vessel Maintainer Refresher and Competency Assessment Course	1	20/02/2025

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1 Introduction

The Nautical Institute (The NI) has introduced a DPVM Refresher and Competency assessment course as a result of NI Training centres running The NI DPVM revalidation course reporting the benefit of using The NI DPVM Revalidation course as a DPVM refresher course and competency assessment. This course can be used to refresh the knowledge of the DPVMs at anytime, or for revalidation of DPVM certificates.

The contents of the DPVM Revalidation and the DPVM Refresher and Competency Assessment Courses are similar. The NI agreed to merge the course with DPVM Refresher and Competency Assessment Course. The single course will be known as the **DPVM Revalidation / DPVM Refresher and Competency Assessment Course.**

If a training centre is approved for the DPVM Revalidation course, it is also approved for the DPVM Refresher and Competency Assessment course. The training centre should amend the title of the course to:

DPVM Revalidation / DPVM Refresher and Competency Assessment Course

Training centres will not need to administer two separate sets of course materials.

DPVM Revalidation and DPVM Refresher and Competency Assessment course participants can attend the same course. It is the training centre's responsibility to ensure they meet the ratio of students as per the NI Standard and approporeat certificate is to be issued at the end of the course.

2 Minimum Entry Qualification Requirements

The minimum entry requirement is a DPVM Certificate issued by The NI. The original DPVM Certificate should be presented at the DP Centre where the DPVM Refresher Course is completed.

The DPVM Refresher and Compency Assessment Course may be completed up to twelve months before the revalidation date set by the NI. The course will be valid for a period of 12 months only, in which the DPVM must apply online to The NI.

3 Number of Hours

The course is conducted over five days with a minimum of 34 hours, which include theory instructions, practical exercises, a practical exam and an online exam.

This Annex also covers Instructor qualifications, extra simulator equipment required, course duration and practical assessment.

4 Ratio of Students/Instructors/Equipment

For classroom-based courses, the NI allows a maximum of eight students per class to be taught by one instructor. By exception and when justified, 12 students may be considered at the discretion of The Nautical Institute, based on Instructor's experience of the training methodology in place.

For online courses the NI allows a maximum of 6 students per class to be taught by one instructor. By exception and when justified, 8 students may be considered at the discretion of The Nautical Institute, based on the Instructor's experience of the training methodology in place.

5 The Role of the Nautical Institute

The Nautical Institute facilitates and administers the accreditation of dynamic positioning training centres and the training of DPOs and DPVMs as per the standard agreed by industry and flag administrations.

6 Accreditation to conduct the DPVM Refresher and Competency Assessment Course

A Nautical Institute-approved DP training centre may apply for accreditation to conduct the DPVM Refresher and Competency Assessment Course if the training centre fulfils the following criteria:

- It has an NI B-Class simulator
- It already holds approval to conduct DP courses
- It has an instructor that meets the requirements in this document

7 Revalidation

A To revalidate a DPVM Certificate, in addition to 150 days of sea time or equivalent, a DPVM needs to:

- Pass an NI online DPVM Revalidation exam

  AND

  Undergo Continuing Professional Development (CPD)

  OR

  Complete an NI DPVM Refresher and Competency Assessment course

B A DPVM with 30 days or more DP sea time may revalidate with the following option:

- NI DPVM Refresher and competency Assessment course

C A DPVM with less than 30 days of DP sea time or less must complete The NI DPVM Revalidation Course. When revalidating using the Revalidation Course for a second or subsequent time, the DP technical staff must follow the rules as per the standard with respect to sea time requirements.

8 DPVM Refresher and Competency Assessment course

Introduction

This NI model course document is to be read in conjunction with:

A. The Nautical Institute Training and Certification Scheme For Key Technical DP Personnel (the DP Vessel Maintainer Course), named as DPVM in this document.
B. Nautical Institute Certification and Accreditation standard Vol.2 – (Accreditation) as updated each year.

Training centres or organisations that have developed training programmes that are compliant with NI DPVM Refresher and Competency Assessment course requirements may apply for accreditation by The Nautical Institute for the course. When an organisation and its course are accredited, it will be authorised to issue certificates bearing the logo of The NI and to promote its course as being compliant with the standard of The NI.

Use of The NI DPVM model course

To use the model course effectively, instructors should review the course plan and detailed syllabus, considering the information on the entry standards specified in the course framework. The actual level of knowledge, skills and prior technical education of the trainees should be kept in mind during this review. Any areas within the detailed syllabus that may cause difficulties because of differences between the actual entry level of trainees and that assumed by the course designer should be identified. To compensate for such differences, all course material shall be sent to The NI for review.

Lesson plans

Training centres are to develop lesson plans based on the detailed teaching syllabus and specifications of simulators. Instructors should pay due attention to the trainees' backgrounds and previous knowledge when adjusting the course content to suit their knowledge and experience and advise of any revision of the course objectives required. The detailed teaching syllabus describes required performances that, together with the exercise scenarios, will be used to deliver the course.

Presentation

The presentation of concepts and methodologies should be repeated in various ways until instructors are satisfied that the trainees have attained each specific learning objective. The syllabus is laid out in learning-objective format and each objective specifies the performance required of the trainees to achieve the intended learning outcomes.

Implementation

For the course to run smoothly and to be effective, considerable attention should be paid to the availability and use of:

- Properly qualified instructors
- Technical and non-technical support staff
- Teaching and other spaces
- Appropriate training equipment and teaching aids
- Videos and multi-media presentations
- Textbooks, one-line drawing, appropriate technical papers and other relevant written material
- Minimum B-Class simulator approved by The Nautical Institute
- Extra simulator requirement for DPVM practical training
- Nautical Institute database of training materials

Course Framework Aim

To give the student the following:

- An understanding of the theoretical and practical operation of DP systems
- Technical understanding of the component parts of the DP and associated systems
- An understanding of the limitations of equipment and the effects of equipment failures
- An understanding of the limitations and the effects of incorrect operation of the systems
- An understanding of work that can safely be undertaken with and without the help of equipment manufacturers and, more importantly, when to stop before affecting the vessel's capability to perform DP operations or redundancy
- The ability to find faults in the DP system and its base components
- An understanding of Failure Modes and Effects Analysis (FMEA) and the philosophy of system redundancy
- An improved ability to operate the engine room and DP equipment in a safe and competent manner
- An understanding of MTS vessel design philosophy and MTS fundamentals
- An understanding of cross-connections and their effect on redundancy
- DP knowledge and vessel-specific and type-specific onboard equipment training

Scope

Seafarers responsible for designated dynamic positioning duties associated with the equipment's maintenance or use in emergency situations should have completed The NI Training for Key Technical Personnel (DP Vessel Maintainer) course for service on ships subject to Dynamic Positioning operations.

This course is essentially a course with practical guidance and information. It provides training and qualifications for engineers, engine officers and ETOs if part of the ship's technical team.

The course consists of theory and practical exercises structured around the safe operation of DP ships, DP classes, design of DP installations, propulsion machinery, auxiliary systems and power generation machinery.

Staff requirements & Instructor Qualifications

The course shall be conducted by an NI DP instructor who is approved and has conducted two DPVM courses.

The course may be delivered by one or two instructors.

The course shall have a suitably qualified ETO, Chief Engineer or DP Service Engineer to support training. If The NI instructor is an engineer or has good in-depth technical knowledge, then extra support may not be required subject to review by The Nautical Institute.

Teaching facilities and equipment

Suitable teaching spaces equipped with the relevant facilities should be provided to facilitate the effective delivery of training, which could be through lectures, group exercises and discussions, as appropriate.

Where the use of multi-media and simulation is intended, it should be ensured that appropriate multi-media equipment and simulators are made available.

The following items of equipment are recommended to enable the trainees to undergo practical exercises on a DP simulator that covers section B-V/f* from the STCW Code and the objective of this course:

- Audio-visual equipment and material
- Whiteboard, interactive whiteboard or flipchart for demonstrations
- Internet connection
- Minimum DP B-Class Simulator recognised by The Nautical Institute
- Extra simulator equipment as listed below
- Requirements of Nautical Institute Certification and Accreditation standard, Vol.2 – (Accreditation), current version

Delivery Method

The course will be based on theory and NI B-Class simulators and will give the participant an overview of DP operation and the effects of system and component failures.

On completion of this course, participants will understand the general arrangements for DP systems and the principles of operation of the equipment. Participants will gain an understanding of the importance of the interaction between the system components and the modes of operation.

This course requires the ability to read and interpret ship drawings, typical product specifications, job sheets, procedures, material labels and safety information as provided. Writing is required to the level of completing workplace forms. The course shall be delivered in English.

Teaching aids

- Instructor manual
- Student manual
- Visual presentations
- Videos
- Drawings
- Samples of sensors

In addition, DP vessel drawings, or other means of demonstration of ship installations of systems for propulsion machinery and auxiliary power generation machinery, should be provided.

Other teaching aids:

- Multi-media training aids such as videos
- E-learning materials and computer-based training (CBT) only if approved by The Nautical Institute before being used for training
- The NI will provide technical support documentation to training schools via The NI website Training Provider
- Training FMEA, vessel drawings and product information. IMCA M117 (only) approved for use by the training centre
- MTS documents approved for use by the training centre

Use of Simulators

When using simulator-based training, instructors should ensure that the aims and objectives of these sessions are defined within the overall training programme and that tasks are selected to relate as closely as possible to shipboard tasks and practices.

Simulator Equipment Required

The minimum simulator requirement is an NI B-Class simulator in an accredited NI training centre. Course contents shall have an assortment of photos of real equipment and DP installations. Photos must cover all parts of a DP system, i.e.:

- Controller
- I/O units
- Optical isolators
- Switchboard
- Environmental sensors
- Position Reference Systems
- UPSs
- Network system

A computer is needed to display different types of serial string. This may be augmented if a real sensor is available. Students should preferably be provided with real hardware and associated equipment, either operational or non-operational.

If a training centre does not have some of the simulator equipment or a screen to show I/O and other information on their simulator, then on a case-by-case basis the auditor will ensure the training notes cover the required course objectives.

Simulator exercises

- Demonstrate a problem with a command signal
- Demonstrate a problem with the feedback signal
- Demonstrate a thruster failing to achieve full thrust
- Demonstrate a reject problem with gyro and wind sensor
- Demonstrate a slow spread of the position reference system, then deselect one position reference system to show how a vessel can have a drive-off with all equipment working correctly
- Demonstrate a slow spread of position reference sensors until one position reference system is rejected by a median or prediction test
- Demonstrate the high loads caused if the set point speed is set too high
- Demonstrate the high load caused when changing heading when the centre of rotation is set away from the centre of the vessel
- Demonstrate having the bow into high wind and current, then turning the vessel 90 degrees and showing high load and loss of position
- Demonstrate if the DP is unstable
- Monitor the command and feedback value in mA on the DP operator screen
- Monitor input serial strings into the DP system on the operator screen if the string is simulated or use a computer program to generate a serial string

Safety routines

Safety precautions during DP drills are important during this course and affect the course structure. Trainees should always be protected from danger while the course is in progress. Training providers should always consider the training spaces, equipment, facilities available and the safety of trainees. During the course, especially during practical drills, trainees should strictly adhere to the safety rules laid down by the training provider.

All the equipment used for practical training should be properly maintained and approved by The Nautical Institute.

General Course Content and Competencies

The general course content and competencies comprise the following:

- General overview of DP
- The power system
- The thruster system
- Control systems and sensors
- Documentation
- DP operation and effects on the DP system
- Safe DP operation of CAM, ASOG, TAM and TAGOS
- Lessons learned
- Manning, training and competency assessment

Timetable

This NI course has been developed providing a recommended range in duration of 34 hours over five days for lectures, demonstrations or simulator exercises and NI online assessment and practical assessment. The training centre is to develop a formal timetable for a DPVM revalidation course.

Training centres must develop their own timetable depending on:

- The level of skill of trainees
- The number to be trained
- The number of instructors
- Simulator facilities and equipment
- Normal practices at the training centre

Course Outline

Review of The Nautical Institute DPVM Training Scheme:

- DP hardware and integration with other ship's systems
- DP software, alarms and position control
- Power system and thruster systems
- Planned maintenance of DP and associated systems and when to call a service technician
- Documentation, DP equipment, Class, IMCA and MTS
- Manning, training and competency assessment
- Safe DP operations
- Essential non-DP Systems – safety systems
- Future trends including automation and integrated bridge management systems
- Simulator exercises

The course comprises lectures, demonstrations and simulation exercises. The outline below identifies the main areas of the course.

A learning objective format is used in the detailed teaching syllabus given in Part C. The outline below is a summary of the course material. The numbering system used below reflects that of the detailed teaching syllabus.

Evaluation and Assessment

The effectiveness of any evaluation depends largely on the precision of the description of what is to be evaluated. The detailed teaching syllabus is thus designed to assist the instructors, with descriptive verbs, mostly taken from the widely used *Bloom's Taxonomy*. Evaluation and Assessment are ways of finding out if learning has taken place. They enable the assessor (instructor) to ascertain if the trainees have gained the required skills and knowledge needed at a given point to effectively demonstrate their competence to perform the tasks set out.

Assessment

In assessing the achievement of competences in section B-V/f* from the STCW Code, assessors should be guided by the criteria for evaluating competences.

Online Assessment

To revalidate the DPVM certificate, the holder must pass an NI online assessment at the training centre or an NI remote exam. The exam is composed of multiple-choice questions and shall be completed within 90 minutes. The online assessment will consist of 40 questions and shall be completed with a pass mark of 70%.

Students who fail at the first attempt are allowed to have another two attempts within six months of the first attempt.

After failing three initial attempts, the student is required to repeat the DP Vessel Maintainer revalidation course and undertake the assessment again.

Practical Assessment

Candidates will also be required to undertake a practical assessment administered by the centre. The following are to be part of a practice exam on the B-Class simulator. Using the DP system display:

- Identify a thruster pitch feedback or rpm error
- Identify a thruster command error
- Identify a position reference system fault, failure or degradation
- Identify a sensor fault or failure
- Identify a power plant configuration where the redundancy concept could be defeated
- Identify a scenario where the vessel is being operated beyond its redundant limits so the WCFDI is defeated
- Identify an alternative thruster or power configuration (thruster or generator not available) and determine whether the redundancy concept is intact or defeated. Can operations be conducted?
- Describe actions with reference to ASOG/CAMO/TAM in response to an equipment status change

Detailed Outline

This correlates the knowledge, understanding and proficiencies defined in the STCW Code and IMCA 117, with the specific learning outcomes that the trainees should achieve. Each specific outcome is presented as a topic or sub-topic as a learning objective reflecting the knowledge, understanding and proficiency in section B- V/f* from the STCW Code.

9 Detailed Learning objectives

The following detailed course contents will allow all training to cover the same objective. The course content is large but many points can be covered by a small paragraph in the PowerPoints.

1	**Course contents and Competencies in Detail to be part of The NI's training centre model course DP Vessel Maintainer**
1.1	The following list of competencies are in detail to ensure that all training centres cover the same contents. Many of the items are just one statement on a PowerPoint. The numbering is based on the current number for DP Knowledge for Technical staff. **The Nautical Institute will supply training centres with an FMEA study and FMEA proving trial, and IMCA, MTS and OCIMF documents on which to base some of their training.**
2	**Brief history of DP system development**
2.1	Development of DP systems and what is needed for offshore drilling
2.2	Brief discussion on the way DP is used
3	**Reasons why DP is used extensively: client requirements, safety, etc**
3.1	When water is too deep for anchors
3.2	Removes the need to make fast to offshore installations and improves safety for crews
3.3	Quick deployment at a new location of any type of vessel
3.4	It is increasingly difficult to manually operate multi-thruster vessels
3.5	Provides a stable platform for crane ops, gangway ops, ROV ops, etc
4	**Types of DP vessel**
4.1	Course to briefly discuss the types of DP vessel and their uses. OSVs, drilling units, construction vessels, dive vessels, pipelay vessels, wind-farm vessels, passenger vessels. Describe types of thruster fitted.
5	**Theory of DP control: Explanation of how the system positions the vessel; Heading; Feedback; Wind; Modelling, Kalman filter, controllers and DP current, etc**
5.1	Be able to discuss briefly the main elements of a DP system, DP computer/controller, thruster and propulsion, power systems, position reference and environmental sensors
5.2	Describe why the DP system requires a wind input
5.3	Describe why the DP system requires a heading input
5.4	Describe why the DP system requires an input for roll, pitch and possibly heave
5.5	Describe full joystick mode
5.6	Describe joystick auto-heading mode
5.7	Describe two-axis control
5.8	Describe full three-axis control
5.9	Describe the difference between DP joystick, remote joystick and independent joystick
5.10	Describe modelling
5.11	Describe the function of Kalman filters
5.12	Describe how DP current is calculated

6	**DP equipment classes as defined in IMO guidelines and classification society rules**
6.1	Describe Class 1, Class 2 and Class 3 DP vessels
6.2	Describe enhanced notation
6.3	Review DP system generic one-line drawing for Class 1, 2 and 3 vessels
6.4	Describe redundancy
6.5	Describe worst-case failure (WCF) in terms of redundancy
6.6	Describe loss of redundancy affecting class of the vessel
6.7	Describe the overuse of power and the effect on WCF redundancy
6.8	Describe what class of vessel is best suited for each industry mission
6.9	Describe consequence analysis alarm and requirement for the use during Class 2 and 3 operation
6.10	Describe what would trigger a consequence analysis alarm
7	**Typical elements of a generic DP system**
7.1	Describe the function of controllers
7.2	Describe the function serial input
7.3	Describe the function analogue and digital input and output
7.4	Describe the function network system
7.5	Describe the function power supplies
8	**The power system**
8.1	All components and systems necessary to supply the DP system with power. The power system includes:
9	**Fuel systems**
9.1	Describe a generic redundant-fuel system
9.2	Describe potential failures and associated impact on DP class
9.3	Describe how contaminated fuel can affect redundancy
9.4	Describe how the cross connection of a fuel system will defeat redundancy
9.5	Describe the effects of inadvertent operation of fuel tank quick-closing valves
10	**Cooling systems, fresh and sea water**
10.1	Describe a generic redundant cooling system for fresh and sea water
10.2	Describe the impact of system failures on DP class
10.3	Describe cooling pipework separation required for Class 3 redundancy
10.4	Describe the requirement to keep plate coolers and sea strainers clean and the effects of overheating. Overheating will lead to a reduction of power available and affect redundancy.
10.5	Describe the use of two sea suction valves in a system
10.6	Describe the effect of weed and jellyfish blocking sea suctions
10.7	Describe the effect of a ballast pump if connected to the same seawater system suction as the cooling system
10.8	Describe the use of antifouling system requirements in seawater systems

11	**Compressed air system**
11.1	Describe the layout of a typical redundant compressed-air system
11.2	Describe the possible effects of compressed-air failure on DP operations
11.3	Describe precautions with sharing ship's compressed air with on-deck industry mission equipment
12	**Ventilation system**
12.1	Describe layout of a redundant engine room ventilation system
12.2	Describe the possible effects of inadvertent closure of ventilation dampers during DP operation
12.3	Describe possible effects of gas detection and fire detection equipment on ventilation systems
13	**HVAC**
13.1	Describe layout of HVAC systems for redundant equipment operation
13.2	Describe the effect that loss of HVAC to engine rooms, equipment rooms, switchboard rooms, control rooms and bridge could have on the DP system
14	**Lubrication system**
14.1	Describe a typical layout of a redundant lubrication system for an engine
14.2	Describe a typical layout of a redundant lubrication system for a propulsion system
14.3	Describe the importance of a pre-lubrication system on a standby generator engine to allow quick start-up
14.4	Describe the consequence of loss of lubrication system for thrusters, CPPs and gearboxes
14.5	Describe the importance of oil sampling and testing as part of the maintenance routines
15	**Main engines**
15.1	Describe a typical generation plant layout and redundant power generation arrangements. Describe both full diesel-electric and direct-drive main thrusters
16	**Main switchboard**
16.1	Discuss the generated voltage options and limitations with regard to main switchboard short-circuit design
16.2	Describe a typical layout and functionality of a redundant switchboard for a diesel-electric power plant
16.3	Describe interlocks on main switchboards
16.4	Describe potential failures and the impact on DP class
16.5	Describe switchboard protection systems
16.6	Describe the term "designed to test"
16.7	Describe a problem with the main switchboard, under and over voltage, under- and over-cycles, short circuits
16.8	Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip
16.9	Describe why you would have thermal imaging conducted on switchboards on DP vessels
16.10	Describe the function of automatic change-over systems
16.11	Discuss the problems with connecting mission equipment to a redundant main switchboard
16.12	Discuss DC main switchboard concepts

16.13	Discuss monitoring equipment on the main switchboard
16.14	Discuss the energy storage system: connections with switchboards, maximum power usage, battery safety
17	**Generators**
17.1	Describe typical arrangements on a DP2 vessel
17.2	Describe spinning reserve and power available
17.3	Discuss the arrangements required to ensure that redundancy remains in place and what factors influence redundancy
17.4	Describe the use of standby generators and at what load a generator should auto-start
17.5	Describe the reason to disable auto-stop on low load when on DP
17.6	Describe how the use of more than 45% utilisation can affect redundancy
17.7	Describe how the electrical power available will affect thruster output
17.8	Describe how the electrical power available will affect the vessel capability plot
17.9	Describe load shedding
17.10	Be able to discuss a one-line electrical drawing
17.11	Describe how generator monitoring systems are different from power management systems
17.12	Describe the AVR control base principle and the result of AVR failure
17.13	Describe the typical plant layout for a diesel-electric DP vessel and compare the layout with a conventional vessel with twin CP propellers. Discuss the advantages and disadvantages of both systems.
17.14	Describe engine shutdown and protection systems
18	**Bus-tie requirements of IMO/class/FMEA**
18.1	Describe open and closed bus tie as per IMO 645/IMO 1580
18.2	Discuss the precautions to be taken before re-closing a bus tie or main breaker after a trip
18.3	Describe how open bus tie can ensure that a fault on one switchboard will not affect another switchboard
18.4	Describe with an example how the main bus-tie breaker and all other breakers are set up as per FMEA
18.5	Describe the benefit of closed bus tie systems
18.6	Explain that after WCF on a closed bus tie system the bus tie is to remain open if tripped during WCF until the fault is found
18.7	Describe breaker selective study, fault ride-through and explain that the main bus tie is to open before the generator breakers
18.8	Discuss new requirements for testing of bus tie breakers
19	**Electrical systems and cabling communications**
19.1	Describe the function of an Uninterrupted Power Supply (UPS)
19.2	Describe a typical UPS arrangement for DP2 and DP3 operations
19.3	Describe how to operate the bypass of a UPS
19.4	Describe test requirements for a UPS

19.5	Describe typical alarms from a UPS
19.6	Describe maintenance and life of UPS batteries
20	**AC supplies**
20.1	Identify on a one-line drawing the redundancy set-up and ensure there are no cross-connections
20.2	Identify what is connected to the AC circuits and possible loads
20.3	Describe a typical one-line diagram for distribution and supply of AC circuits on a DP vessel
20.4	Identify what is connected to the AC circuits and which are critical to DP operations
20.5	Explain that all sub-tie-breakers need to stay open regardless of whether the main tie breaker is open or closed
20.6	Discuss circuit protection and fuses
20.7	Discuss testing of auto-standby circuits for pumps, steering etc
21	**DC supplies**
21.1	Describe a typical 24V DC redundant supply one-line diagram.
21.2	Describe the various arrangements for backup supplies to engine control systems and switchboards.
21.3	Describe the risk of cross connections in 24V supplies.
21.4	Describe the problem of earth faults on two redundant systems and the use of DC/DC isolated supplies
21.5	Discuss the importance of clearing DC earth faults promptly for safe operation
21.6	Describe procedures for testing and maintenance of battery backup systems
21.7	Describe what could happen if there is a loss of charging power
21.8	Describe typical alarms from 24V DC systems
22	**Digital interference**
22.1	Describe a typical digital interface arrangement to a DP controller
22.2	Describe why a digital input is required by a DP controller and what system inputs normally use this type of input
22.3	Describe how a digital signal may be transmitted over a network from a remote I/O station
22.4	Discuss fail-safe modes for digital signals and networks
22.5	Describe the loss of redundancy upon failure of one multi-channel interface unit (I/O) with input connected signal from two different redundancy groups
22.6	Discuss testing of digital signals
23	**Analogue interface**
23.1	Describe the different analogue signals associated with DP control systems and their use
23.2	Describe the benefit of 4-20 mA signals for control and feedback of thrusters and main drives
23.3	Discuss testing of analogue signals
24	**Serial interface**
24.1	Describe the concept of serial data transmission and its use in DP control systems. What is NMEA?
24.2	Describe the various types of serial connection, RS232 & RS422
24.3	Describe the different types of NMEA protocol sentence formats and how to read them

24.4	Describe how to monitor NMEA string using the DP display, laptop or meter
24.5	Describe a simple check for NMEA string data errors
24.6	Describe the benefit of using RS422 serial connections over RS232
24.7	Discuss serial isolators and serial signal convertors
24.8	Discuss cable requirements for interconnection of serial units
24.9	Discuss or show examples on different NMEA strings (such as GNSS, wind, gyro)
24.10	Describe the purpose and use of optical isolator units
25	**Network systems**
25.1	Network layout for DP system
25.2	Network storm
25.3	Network testing
26	**Power management system custom systems and IMO DP equipment Class 2/3 requirements**
26.1	Maintaining continuity of electrical power under all defined load and failure conditions
26.2	General system functions
26.3	Describe typical power management systems for a DP vessel
26.4	Describe why a breaker selective study is required and its importance
26.5	Describe the difference between DP power limiting and generator power management
26.6	Explain why to disable a load-dependent stop while in DP mode
26.7	Describe a generator monitoring system and the important information it supplies
27	**Extra loads on switchboard with different operation, drilling, ROV etc**
27.1	Describe the need for a new load balance study when connecting extra equipment, such as an ROV
27.2	Describe the possible reduced power to thrusters
27.3	Describe the possible effect on the vessel's capability plot
27.4	Describe the problem of supply from only one switchboard and the loss of the switchboard
27.5	Describe how, when a piece of equipment fails, the fault transfers to the switchboard that caused a blackout
27.6	Explain load balance study
27.7	Explain what the term "designed to test" means
27.8	Describe auto blackout recovery
27.9	Describe load-dependent start and explain that the vessel could have passed the WCF load before the extra generator starts
27.10	Discuss why there may be different parameters in the PMS for DP operation and sea mode
27.11	Discuss system failures that can affect the operation of the PMS and the backup operating modes that are available
27.12	Discuss advanced generator supervisory systems and their independent operation from the PMS
27.13	Describe the extra redundancy required for working 'drift-on'
27.14	Explain the need for more spinning reserve when working 'drift-on'

28	**Cabling**
28.1	Describe the need to keep cables away from heat, including exhaust flow
28.2	Describe the physical cable routeing for Class 3 vessels as per IMO 645/1580 and classification society requirements
28.3	Describe the importance of separation between power cables and control and data cables
28.4	Discuss use of separate cable trays and physical routeing to maintain redundancy
28.5	Describe the use and grounding arrangements for screened signal cables
28.6	Describe the problem of replacing cables with the wrong type, not twist pairs
28.7	Describe the problem of network cable near radio transmitters
28.8	Discuss the use of fibre-optic cable and its advantages over conventional types
29	**The thruster system**
29.1	Describe the components and systems necessary to supply the DP system with thrust force and direction. These include azimuth thrusters, tunnel thrusters, propellers and other systems.
30	**Thruster control concepts**
30.1	Describe how a DP system is typically connected to a thruster control system, including normal control and backup control (on thruster control system)
30.2	Describe how emergency operation of thrusters will affect the DP control of the thrusters
31	**Thruster redundancy**
31.1	Describe thruster supply change-over
31.2	Describe how changing over a thruster that has failed could transfer the fault to a second redundancy group
32	**Thruster failure modes**
32.1	Describe "Fail as set"
32.2	Describe "Fail to zero"
32.3	Describe "Fail to full"
32.4	Describe why you would lose the ready signal.
32.5	Explain that emergency stops will still work when vessel is in DP control
32.6	Describe the effect on the DP system of a failed thruster
32.7	Describe the counterbalance effect of other thrusters when a thruster fails and the vessel is left in full auto DP mode
32.8	Describe thruster control by IP over ethernet and troubleshooting
33	**Azimuth thrusters, tunnel thrusters, propellers and other systems**
33.1	Describe standard fixed-pitch propeller advantages and disadvantages
33.2	Describe standard CPP advantages and disadvantages
33.3	Describe tunnel thruster advantages and disadvantages
33.4	Describe drop-down and fixed-in-position azimuth thrusters
33.5	Describe fixed pitch thrusters' advantages and disadvantages
33.6	Describe CPP azimuthing thruster advantages and disadvantages

33.7	Describe flap/Becker rudders and their advantages and disadvantages
33.8	Describe fishtail rudders and their advantages and disadvantages
33.9	Describe propeller nozzles and their advantages and disadvantages
33.10	Describe variable-frequency drives and their advantages and disadvantages
33.11	Describe direct-drive and its advantages and disadvantages
33.12	Describe constant-speed RPM motors for CPP thrusters and their advantages and disadvantages
34	**Thruster control concepts**
34.1	The following objectives (34.2–34.10) address the components and systems necessary to supply the DP system with thrust force and direction.
34.2	Describe the thruster-ready signal and what parameters are required for it to be present
34.3	Describe auto start-up of thrusters and auto selection into the DP system if a full blackout auto recovery system is fitted. Recovery system is programmed into the power management system.
34.4	Describe command and feedback signals (mA and V) and explain which one is better
34.5	Describe emergency stop on a thruster
34.6	Describe wire-break monitoring
34.7	Describe remote I/O concepts used in a thruster-control network or can bus systems
34.8	Describe backup redundancy on control systems
34.9	Describe typical alarms on thruster controls and DP systems
34.10	Describe testing of thruster signals for DP trials
35	**Thruster redundancy**
35.1	Describe typical thruster main power supply systems for redundancy
35.2	Describe typical backup hydraulic pumps, steering motors, cooling pumps, filters, cooling systems and fans fitted to rudder and thruster systems
36	**Thruster failure modes**
36.1	Describe what would indicate the following on a DP system: fail as set, fail to zero, fail to full, loss of ready signal
36.2	Describe a hydraulic problem with CPP thrusters
36.3	Explain how a thruster could always have a mechanical problem
37	**Control systems and sensors**
37.1	Overview of control system, software and sensors
38	**DP operator workstation**
38.1	Describe a typical operator workstation and the various hardware components
38.2	Describe the management for changing software
38.3	Explain that the DP system must be fully tested to check operation after a software upgrade
38.4	Describe typical maintenance and testing that should be carried out on a workstation
38.5	Describe a typical procedure for total shutdown and re-starting of a DP control system
38.6	Discuss how to download log files for analysis

39	**Control processor(s)**
39.1	Describe the function of the control processor in the DP control system
39.2	Describe the redundant design incorporated into the control system
39.3	Describe the redundant interconnections between the control processor and the I/O units
39.4	Describe how a failure on a DP controller is typically handled to maintain position-keeping
40	**Independent joystick system (IJS)**
40.1	Independent joystick system (IJS)
40.2	Describe the difference between IJS and portable/wing joysticks
40.3	Describe the class requirement for IJS
40.4	Explain how on some older vessels the IJS can use the same controllers
40.5	Describe how a IJS is powered
40.6	Describe which DP sensors and references are also typically used for the IJS
41	**Changeover switch, manual controls/DP/joystick**
41.1	Describe the design of a typical change-over switch as a multi-gang switch on a single operating spindle and how these are not electrically connected
41.2	Explain that a common change-over switch removes the ready signal from the thruster to a DP system
41.3	Describe the changeover switch in a network thruster control system
41.4	Describe wire break monitoring on emergency change-over from DP to manual and on a DP-to-manual network control system
41.5	Describe wire break monitoring on emergency change-over from DP to manual and on a DP-to-manual network control system
41.6	Explain that the emergency stop and backup/emergency controls will still work with a changeover switch set to manual or DP or IJS mode
42	**DP software**
42.1	Describe the six degrees of freedom and which of these the DP system controls
42.2	Describe a hydrodynamic model
42.3	Describe an aeronautical model
42.4	Describe a DP mathematical model and PID control loop
42.5	Describe DP current
42.6	Describe an error affecting the DP current
42.7	Explain why the mathematical model can become unstable
42.8	Describe auto swap on the operator station and controllers and class rules about swapping
42.9	Describe DP modes
42.10	Describe backup copy and reloading program, following manufacturers' instructions
43	**Alarms**
43.1	Describe the need to set alarms to warn at an early stage
43.2	Explain that the DPO and engineer must understand what the alarm is and what caused it
43.3	Describe how to find information about an alarm in vessel documents and on-screen help

44	**Position reference systems: hardware, software and sensors**
44.1	Explain why position reference systems are used by the DP program
44.2	Describe the minimum number of position reference systems required to meet Class 1, 2 and 3
44.3	Describe position reference system voting
44.4	Describe the difference between 'fixed' and 'mobile' relative position reference systems
44.5	Describe what happens when all position reference systems are lost from the DP system
45	**GNSS / DGNSS**
45.1	Describe the principle of GNSS systems
45.2	Describe DGNSS and the use of correction to improve the quality of a position fix
45.3	Describe the different ways DGNSS corrections are received
45.4	Describe the disadvantages of the DGNSS system
45.5	Describe the advantages of the DGNSS system
45.6	Describe the use of INS to improve the reliability of position
45.7	Describe how to identify an antenna problem
45.8	Describe the blocking of a correction signal
45.9	Describe the azimuth and elevation of a corrections satellite
45.10	Describe failure modes
45.11	Describe maintenance and logical fault-finding
45.12	Describe jamming and spoofing of DGNSS systems
46	**Acoustic**
46.1	Describe the principle of an acoustic system
46.2	Explain why the speed of sound through the water is required
46.3	Describe its advantages
46.4	Describe its disadvantages
46.5	Describe its failure modes
46.6	Describe its maintenance and logical fault-finding
46.7	Discuss transponder types and uses, and charging of transponders
47	**Taut wire**
47.1	Describe the principle of a taut wire system
47.2	Describe its advantages
47.3	Describe its disadvantages
47.4	Describe its failure modes
47.5	Describe its maintenance and logical fault-finding
48	**Laser – system**
48.1	Describe the principle of a CyScan system
48.2	Describe its advantages

48.3	Describe its disadvantages
48.4	Describe its failure modes
48.5	Describe its maintenance and logical fault-finding
48.6	Describe the different types of laser target, use and maintenance
48.7	Describe CyScan AS targets
48.8	Describe a SceneScan targetless laser system
49	**Microwave – systems, short- and long-range**
49.1	Describe the principle of a RadaScan, Radius or Artemis system
49.2	Describe the positioning of interrogator units
49.3	Describe the advantages of microwave systems
49.4	Describe the disadvantages of microwave systems
49.5	Describe their failure modes
49.6	Describe their maintenance and logical fault-finding
49.7	Describe their transponders and battery maintenance requirements
50	**Inertial navigation systems**
50.1	Inertial navigation systems
50.2	Describe their advantages
50.3	Describe their disadvantages
50.4	Describe how INS is used with DGNSS and hydro acoustic systems
50.5	Describe their failure modes
50.6	Describe their maintenance and logical fault-finding
51	**DP sensor systems**
52	**Gyro**
52.1	Describe the principle of a standard gyro compass
52.2	Describe the principle of a fibre optic gyro compass
52.3	Describe its failure modes
52.4	Describe why a gyro might need to be set to manual speed and latitude
52.5	Describe its maintenance and logical fault-finding
53	**Environment sensors – MRU/VRU**
53.1	Describe the principle of a VRS/VRU
53.2	Describe why a DP system needs an MRU/VRS input
53.3	Describe its failure modes
53.4	Describe the maintenance logical fault-finding and calibration required
53.5	Explain that some MRU/VRS have internal batteries
54	**Environment sensors – wind sensor**
54.1	Describe the principle of propeller and ultrasonic wind sensors
54.2	Describe wind feed forward

54.3	Describe the effect on DP from wind sensor outputting too high a speed and its effect on the model
54.4	Describe the effect on DP from wind senor outputting too low a speed and its effects on the DP model
54.5	Describe the advantages and disadvantages of sensor types
54.6	Describe maintenance and logical fault finding
54.7	Describe simple checks, e.g. flags or obstructions
54.8	Describe problems arising from poor positioning of wind sensors
55	**Peripherals**
56	**Printer**
56.1	Describe the DP printer and the need for it to be online during DP operations
56.2	Discuss DP data loggers as independent to the DP system, can replace as long as you can print alarms
56.3	Discuss how to download log files for analysis
57	**Documentation**
58	**DP manual**
58.1	Explain that every DP vessel must have a DP manual that outlines DP operations, company DP policy, onboard documents, training and vessel hardware. Some classification societies require the DP manual to be class-reviewed.
59	**FMEA**
59.1	Explain what FMEA stands for
59.2	Explain why an FMEA is required and the legislation associated with FMEA
59.3	Describe what is contained in the two main sections of an FMEA
59.4	Describe the content of the vessel study
59.5	Describe the process of developing an FMEA and the international guidelines that are recommended
59.6	Describe the overall contents of the proving trials section
59.7	Describe the meanings of A, B and C findings
59.8	Describe the requirement for FMEA to be class-approved
59.9	Describe what WCFDI is and why is it important
59.10	Describe how to conduct FMEA trials safely
59.11	Explain why a copy of the FMEA must be in the engine room and control room
59.12	Discuss an actual Vessel FMEA to illustrate the process of redundant system review
59.13	Describe actions to take if errors are found in an FMEA
59.14	Describe the use of FMEA functional description and block diagrams for fault finding and tracing of faults
60	**DP annual trials**
60.1	Annual trials as per IMO 1580 and IMCA M 190
60.2	Explain why CPP and thruster wire breaks need to be tested every year
60.3	Explain that the redundancy group is to be tested each year

61	**Capability plots**
61.1	Explain what a capability plot is
61.2	Describe the capability plot for WCF
61.3	Describe the difference between a capability plot and a footprint plot
61.4	Explain why a footprint plot cannot be used to check a capability plot
61.5	Describe the errors that can occur within capability plots
61.6	Explain how to use a max thruster limit of 45% utilisation to safeguard against error in capability plots
61.7	Describe an online capability plot
61.8	Explain why reducing the number of generators and power available can affect the capability plot
62	**Management of Change Procedures**
62.1	Explain what is meant by management of change
62.2	Explain why management of change is important
62.3	Describe what management of change is required for changes of hardware, software, FMEA
63	**System and equipment manuals**
63.1	Discuss the importance of having a full set of operating and maintenance manuals for all DP related systems
63.2	Discuss the importance of having a full set of up-to-date 'as-built' technical drawings for the vessel
63.3	Discuss the use and development of bridge and engine room DP checklists
64	**Hazards**
64.1	Explain the importance of not carrying out unauthorised maintenance during any DP operation and permit to work
64.2	Describe managing risk during reinstatement of equipment
65	**Incident reporting – IMCA and MTS schemes**
65.1	Discuss incident reporting forms for IMCA and MTS
65.2	Discuss recent and relevant incident reports
66	**Planned maintenance system**
66.1	Discuss the importance of an effective planned preventative maintenance system for all machinery and equipment related to DP
66.2	Discuss the importance of maintaining good record keeping and equipment histories
66.3	Discuss the importance of record keeping of service reports and technical bulletins relating to the DP equipment
66.4	Describe the process and responsibilities of planning maintenance activities that may affect DP operations
66.5	Discuss the requirements to carry critical spares for all DP equipment
67	**Documentation**
67.1	IMO Documents
67.1.1	Describe IMO 645 and IMO 1580
67.1.2	Describe IMO 738 and its links to IMCA 117

67.2	OCIMF – Oil Companies International Marine Forum
67.2.1	DP Failure Mode Effects Analysis Assurance Framework Risk-Based Guidance
68	**Use of IMO 645/1580 by Class, IMCA and MTS**
68.1	Discuss class use of IMO 645/1580 and IMCA/MTS documents to formulate class rules
69	**MTS Documents available and what they contain**
69.1	MTS Design Philosophy
69.1.1	Offshore Tech Guidance DP-classed vessels with closed bus-tie(s)
69.1.2	DP Vessel Design Philosophy Guidance Part 1
69.1.3	DP Vessel Design Philosophy Guidance Part 2
69.2	MTS DP Operation Guidance
69.2.1	DP Guidance Part 2, Appendix 3 Logistics
69.2.3	DP Guidelines on Testing of DP Systems
69.2.4	DP Tech Committee DP Operations Guidance Part 1
69.3	MTS tech ops
69.3.1	Techop annual DP trials and gap analysis
69.3.2	Techop FMEA gap analysis
69.3.3	Techop FMEA testing
69.3.4	Cross connections
69.3.5	All other tech ops
70	**IMCA documents available and what they contain**
70.1	IMCA M103 – The design & operation of DP vessels
70.2	IMCA M109 – DP-related documentation for DP vessels
70.3	IMCA M117 – Code of practice for the training & experience of key DP personnel, August 2023
70.4	IMCA M125 – Safety interface document for a DP vessel working near an offshore platform
70.5	IMCA M140 – Specification for DP capability plots
70.6	IMCA M163 – Guidelines for quality assurance & quality control of software
70.7	IMCA M166 – Guidance on FMEA
70.8	IMCA M182 – MSF International Guidelines for the Safe Operation of DP OSV
70.8	IMCA M190 – Guidance for developing and conducting DP annual trials programmes
70.10	IMCA M206 – A guide to DP electrical power and control systems
70.11	IMCA M220 – Guidance on Operational Activity Planning
70.12	IMCA M244 – Guidance On Vessel USBL Systems For Use In Offshore Survey, Positioning And DP operations
70.13	IMCA M247 – Identify DP system components and their failure modes
70.14	IMCA M252 – Guidance on position reference systems and sensors for DP operations

71	**Manning, training and DP emergency drills**
71.1	Describe engine room manning and watchkeeping principles for DP operations
71.2	Describe requirements for good communication between bridge and engine room at all times
71.3	Describe the use of checklists and the need to promptly report to bridge any changes in operational status
71.4	Describe the need to keep the Chief Engineer updated with any operational problems
71.5	Describe the operation of the status alert system
71.6	Explain the requirement for comprehensive engine room standing orders
71.7	Explain the requirement for a comprehensive handover during change of watchkeepers
71.8	Describe the planning of onboard drills, real and desktop
71.9	Describe the use of 'mobilisation' and 'start of project' DP trials to ensure system operational readiness
71.10	Describe the development of standard engine room DP procedures for a vessel
71.11	Explain the need for performing DP drills and their different types
71.12	Describe how to conduct a partial blackout drill
71.13	Describe how to conduct a full blackout drill
71.14	Describe how to conduct a drill for a broken fuel line
71.15	Describe how to conduct a drill for a broken cooling pipe
71.16	Describe how to conduct a fire drill when on DP
72	**DP operation and effects on DP system**
73	**ASOG – principle, layout and use of activity-specific operational guidelines**
73.1	Describe IMCA 220 and MTS Tech Ops documents outline of ASOG in detail
73.2	Describe the ASOG list of how the vessel equipment is set up for the current industry mission
73.3	Explain how ASOG should match the FMEA
73.4	Explain how ASOG will state what action to take after a failure
73.5	Explain why ASOG needs to be approved by charterer, shore management and vessel
73.6	Describe how the ASOG can be used as a decision-making tool after a failure
73.7	Describe how the ASOG is used for the safe set-up of DP vessel
73.8	Explain that the ASOG is the bridging document between the vessel and charterer and how the DPO must have their vessel set-up and operational limits
73.9	Describe the alignment of the alert light system and ASOG
73.10	Describe how the ASOG/CAM is used to reduce risk.
73.11	Explain why the CAMO must match class-approved FMEA
73.12	Describe the use of 'status light' systems on DP vessels
73.13	Explain how the ASOG/CAMO is a bridge document between vessel documentation and charterer working limits and equipment set-up requirements

74	**CAMO – principle and layout of critical activity mode of operation**
74.1	Explain how IMCA 220 and MTS Tech Ops documents outline CAMO in detail
74.2	Explain how CAMO mode set is set up as a redundancy mode of operation
74.3	Describe how the CAMO must match the vessel's FMEA
75	**TAM – principle and layout of task-appropriate mode**
75.1	Describe the IMCA 220 and MTS Tech Ops documents outline TAM in detail
75.2	Explain how the TAM requirement could be less than required by the FMEA and after a failure the vessel could have a loss of position
75.3	Explain how the TAM requirement could be less than required by the FMEA and after a failure the vessel could have a loss of position
76	**TAGOS – principle and layout of thruster and generator operating strategy**
76.1	Describe how the TAGOS can be used to list what combination of generators can be online, setting of all tie breakers and maximum percentage of load used
76.2	Describe the TAGOS arrangements
77	**Limitations of different types of DP operation**
77.1	Explain how the mode of operation will depend on the modes supplied with DP system
77.2	Explain why a DP vessel cannot be used for anchor handling unless a tow-winch tension meter is connected to the DP and describe the problem if the tension meter fails
78	**SIMOPS**
78.1	Describe limitations and extra redundancy required when a vessel is in close proximity and experiences drift-on
78.2	Explain why extra redundancy and generators may be requested by the DPO in a high-risk drift-on
78.3	Explain why at times the main watchkeeping engineer might need to stay in the control room
78.4	Describe how a vessel can be affected by thruster wash from other vessels
78.5	Describe how working in close proximity to other vessels might limit the options for manoeuvring the vessel in event of a failure
79	**Operating in open water**
79.1	Describe how in open water the vessel (ROV/Bell) might be 'drift-on' to a subsea asset
79.2	Describe which position reference system will not work in open water
80	**Possible effects of subsea operation on DP vessels**
80.1	Describe the effect of underwater current on drilling risers, Lars, tether and of the ROV leading force on DP
80.2	Describe the risks of launch and recovery operations
80.3	Describe the danger of a tether becoming entangled in thrusters
81	**Possible effects of remote access**
81.1	Describe using remote diagnostics and the danger of use during DP
81.2	Describe the potential damage of cross connecting a network system and cyber attack

82	**Lessons learned**
82.1	Describe common causes of DP incidents based on past incident case studies
82.2	Review IMCA DP incident flowcharts
82.3	Review various published incident reports (IMCA, MTS, US Coast Guard)
83	**Information required when reporting system problems**
83.1	Describe what information is required for remote diagnostics, where to find it and how to communicate
83.2	Describe common methods of copying system log files from the operator station computer for fault analysis by the equipment maker
83.3	Describe the use of screen shots and photos of the equipment to aid fault-finding, supported by copies of the alarm printouts of both DP and machinery alarms taken when the fault occurred
83.4	Discuss the importance of maintaining records of correspondence of any fault with the equipment maker's service department and including all relevant company technical and operations departments in the correspondence
83.5	Discuss the trend in remote access via satellite link of some equipment makers. Highlight the security risks of this type of arrangement.