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# DP Sea Time Validation: An in-depth review of the commonly utilized DP validation practices and suggestions for how the industry can improve

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## Abstract (as submitted in April 2018).

The Offshore Service Vessel Dynamic Positioning Authority (OSVDPA) proposes a paper recommending and justifying minimum standards for sea time validation techniques utilized when reviewing the experience accrued by DPOs and Prospective DPOs. The paper shall also describe how the resources utilized to record onboard DP experience could be modified to facilitate better validation techniques.

The OSVDPA's DPO Certification Scheme is predicated on the belief that certification is a product of classroom learning, experience gathering, and the passing of practical assessments. While the OSVDPA believes the primary component is passage of practical assessments, it also believes that all three components require independent and effective validation prior to issuing a certificate.

In its attempt to validate sea time, the OSVDPA has found that a significant amount of experience recorded by DPOs and Prospective DPOs should not qualify as DP experience gathering because there is scant evidence that the DP system was utilized during the record period. Moreover, the OSVDPA is concerned that the industry-accepted sea time validation techniques do not catch these mischaracterizations.

As a result of these concerns, the OSVDPA has developed a comprehensive and extensive sea time validation technique that involves comparing the DPO or Prospective DPO's logbook against a company-produced sea service letter as well as independent data on the vessels actual activities during the times recorded by the DPO or Prospective DPO. By using this system, the OSVDPA has found that many DPOs or Prospective DPOs have less DP experience than what is claimed in their logbook.

As previously stated, the OSVDPA believes that passage of assessments is a better metric for ensuring a DPO or Prospective DPO meets the certification requirements. However, the OSVDPA also realizes that our industry heavily or exclusively utilizes sea time for this purpose. As such, the OSVDPA offers to present its sea time validation process in the hopes that this process—or something meeting an equivalent standard—is accepted throughout the industry. In addition, this review will also discuss how the OSVDPA's system has been hindered by the existing sea time validation tools and discuss how improvements to these tools would result in a more competent industry.

## Introduction and Executive Summary.

The maritime industry, in general, and the dynamic positioning (DP) industry, in particular, have always placed a heavy emphasis on practical experience as a measure of competency. There is good reason for this emphasis, numerous studies of the DP industry, maritime industry, and other highly critical industries have found that experience is one of the best ways to breed competency and prevent skill fade. This paper will fully describe the experience-gathering requirements, and tracking techniques of the DP industry.

Subsequently, this paper demonstrates how the standard methods used validate the experience gathered by dynamic positioning operators (DPOs) and prospective DPOs are lacking. Specifically, the paper presents a data sample extracted from DPO's request for accreditation submitted to the OSVDPA which demonstrates the lack of reliability in this data and the inability of existing validation techniques to catch these irregularities.

When independently compared to vessel movement data, 26 percent of the sea time claimed by DPOs or Prospective DPOs in this sample does not appear to meet industry standards for DP experience gathering.

Understanding this fact, the Offshore Service Vessel Dynamic Positioning Authority (OSVDPA) has a two-step experience verification process; whereby, Sea Time claimed by DPOs and Prospective DPOs is cross

referenced against a company-supplied sea service letter and vessel movement data as recorded by Automatic Identification System (AIS). This second layer exceeds the existing industry standards, where claimed sea time is only validated against a sea service letter from the DPO or prospective DPO's employer.

The result of the OSVDPA's increased validation methods has been the exclusion of numerous days of Sea Time that would have been counted or that were counted under existing industry standards. This has resulted in the OSVDPA directing DPOs and Prospective DPOs to garner more experience prior to being awarded or renewing his or her certificate.

Considering the importance of experience to creating a competent DPO, The OSVDPA suggests that the industry support the wide-spread use of this experience validation technique.

## History of Maritime Experience Requirements.

Mariner education and training has a long history of learning-by-doing, "on-the-job training," or experience-based education. This tradition was codified in 1978 when the International Maritime Organization (IMO), then the Intergovernmental Maritime Consultative Organization, published the *International Conventions on Standards of Training, Certification and Watchkeeping for Seafarers* (The Intergovernmental Maritime Consultative Organization, 1978). Following maritime tradition, these standards are generally experience based, "experience is relied on as the means by which mariners acquire practical knowledge and become capable of effectively applying theoretical and practical knowledge, skills, and abilities" (National Research Council, 1996).

While varying levels of experience are required based upon the position sought and the tonnage of the mariner's vessel, almost all STCW training standards require experience to be gained. This is true even when simulator-based courses are allowed for training. In these cases, the simulator time is sometimes counted as part of the experience-gathering requirement. However, a simulator-based training is never used replace sea-based experience. In 2010, changes were made during a conference in Manila, Philippines to the STCW Code (Manila Amendments). In most pertinent part, these changes required certain courses, licenses, and other approvals to be periodically revalidated to guard against skill fade. In most cases, the period for revalidation is every five (5) years (The International Maritime Organization, 2010).

There are very good reasons for the IMO to include these recency requirements into the STCW code, an ever-increasing library of scholarly research demonstrates that skill fade is a real threat to cognitive and motor skills. Once such study for the General Medical Council found:

> There is substantial evidence that time out of practice does impact on skills retention. Skills have been shown to decline over periods ranging from 6 to 18 months, according to a curve, with a steeper decline at the outset and a more gradual decline as time passes. The amount of time between learning and losing a skill varies between skills and between individuals, with many mitigating factors. (General Medical Council, 2014)

Some studies have attempted to determine which skills fade faster. A U.S. Army study found that motor skills started to deteriorate after 10 months, while the ability to recall procedures decayed six (6) months after their last use (Wisher, 1999); confirming an earlier study, "after 365 days of non use or non practice, the average participant's performance was reduced by almost a full standard deviation" (Arthur, 1998).

The available research has also reached interesting conclusions regarding what can prevent, mitigate, or allow an individual to recover from skill fade. Specifically, in a paper for *Military Medicine*, a group of researchers found the following factors mitigated—but did not prevent skill fade:

- Length of time the skill was not used;
- Amount of "overlearning" (training beyond the mastery level);
- Complexity of the task, i.e. psychomotor verses cognitive, number of steps involved, etc.;
- Type of test used to prove orginial mastery;
- "Condition of retrieval" (e.g. is recall required or is simple recognition enough);
- Training and instructional methods used;
- Individual differences; and
- Motivation (Perez, 2013).

Conversely, a study performed for the Israeli military of experienced service member's proficiency in both knowledge-based requirements and practical abilities found that refresher courses helped delay the decay of procedural knowledge, but these courses did not impact the retention of practical abilities (Henik, 2002)

This review is interesting in that it confirms the maritime industry's support of experience-based training, the need to continue experience gathering throughout a career, and the more effective nature of continuing to maintain experience levels over classroom-based training.

## History of DPO Experience Requirements.

As a result of the above-described maritime history, a significant prerequisite of a DPO certificate, since its inception in the early 1980s, has been the requirement to gain experience operating a DP system on a working vessel. With that inheritance, the DP industry has, at times, also inherited the broader maritime industry's definition—or at least perception—of how experience should be measured and tracked. Specifically, measuring experience by time on the vessel, not time on DP. While such a system apparently works for general maritime experience, it is an awkward, if not inappropriate, fit for DP that—depending upon the type of vessel—is not necessarily utilized daily.

Notwithstanding the sometimes less than clear understanding of how experience should be tracked, all major DPO certification bodies, or those that have provided guidance on DPO certification requirements, have included experience gathering as a requirement. The below traces a history of the DPO experience-gathering and tracking guidance or requirements for the International Marine Contractors Association (IMCA), International Maritime Organization (IMO), Nautical Institute, DNV GL, and OSVDPA.

## International Marine Contractors Association.

The first iteration of IMCA M 117 which stated prominently in Section 1.1.1 "[i]t is also accepted that vessel specific training and experience is essential" (The International Marine Contractors Association, 1996). This guidance continues to state that all experience gathering should be recorded:

> The amount of training and experience necessary for key DP personnel should depend on the type of vessel and the consequences of the position loss during their work. It is in the interest of vessel owners/operators as well as the individuals on board to keep records of the training and experience of key DP personnel. (The International Marine Contractors Association, 1996)

This concept was continued in the 2006-issued revision of IMCA M 117. This document started off stating, "[e]very vessel owner/operator agrees that trained and experienced key DP personnel are essential for a safe and commercially successful operation" (The International Marine Contractors Association, 2006).

The inclusion of experience in the first sentence of this guidance demonstrates the import placed upon experience gathering.

This revision of IMCA M 117 also notes that experience is not only important for those seeking certification as a DPO, but that experience should be gained, and tracked, for certificated DPOs as well, stating, "[o]nce a Nautical Institute DPO certificate is obtained, it is necessary to demonstrate continued competency. An essential part of that process is to record post-certificate DP time" (The International Marine Contractors Association, 2006).

IMCA M 117 was again updated in 2016. Reflecting the proliferation of DP across vessel types and industrial missions, the amended guidance struck references to specific DPO certificate bodies and specific amounts of experience as being the standard for what equals an experienced DPO. However, this revision of the guidance did continue to state that DPOs must have gained experience operating DP equipment:

> Thereafter, it is a requirement that experience is needed to consolidate the knowledge acquired while under training. After an appropriate amount of experience is gained, a person can become 'operationally' competent such that they are able to adequately perform their role without the direct assistance of another person. (The International Marine Contractors Association, 2016)

The guidance continues that this experience gathering should be recorded: "This supervised DP experience onboard a DP vessel should be properly documented." (The International Marine Contractors Association, 2016).

It is also important to note that this version of IMCA M 117 also discusses the ways in which skill fade can be protected against or mitigated via continuous professional development. Primarily, these sections deal with experience gathering and the associated tracking of such experience.

Due to the importance of this issue, this revision of IMCA M 117 also prescribed the continued tracking of experience, stating, "[w]hichever DP training scheme is followed it is necessary to demonstrate continued development of competency through operational DP practice. An essential part of that process is to record the details of operational DP time." (The International Marine Contractors Association, 2016).

As indicated above, IMCA publishes a logbook that is utilized by DPOs to track their experience after they have been awarded their certification. This logbook requires the participants to list the day they joined the vessel and the day the left the vessel, subsequently requiring the DPOs to list how many hours the vessel was on DP during this time.

## Standards of Training, Certification and Watchkeeping for Seafarers.

As stated, the DP industry inherited its emphasis on experience from the broader maritime industry, thus it is no surprise that this concept figures heavily into the DP training recommendations included in the STCW Code, made in the Manila Amendments. Specifically, Section B-V/f makes repeated references to the importance of experience in the certification of a DPO stating:

> 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.
>
> 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. (The International Maritime Organization, 2010)

As stated above, the 2010 amendments to the STCW Code also included the revalidation requirements, these requirements were not directed at the DPO certification guidelines, however, the DPO certification industry has amended or designed its schemes to comply with the spirit of the revalidation guidance.

### Nautical Institute.

The initial Nautical Institute DPO Certification Scheme was heavily based upon the applicants gaining experience. In general, the scheme prior to 2013 required those seeking a DPO certificate to complete one (1) 30-day period of sea-going familiarization and one (1) period of 180 days of DP watchkeeping.

Interestingly, during this period, the experience-gathering requirement was not necessarily tied directly to DP experience. The July 2012 Nautical Institute manual oscillates between defining experience as time on DP, and time on the vessel. For example, the guide defines a "DP day" as "any day when DP operations are undertaken by the vessel. (A minimum of one hour is accepted)." Conversely, the manual states that the second period of experience gathering is based upon total time onboard, stating. "If the six months supervised DP watchkeeping experience has been exclusively aboard DP Class 1 vessels" (The Nautical Institute, 2012)

The section of the manual applying to the first period of experience gathering is also less than clear, requiring the individual to accrue 30 days of "DP experience." This term is not defined in the manual; however, the section describing phase includes the following:

> The Institute does not wish to extend this familiarisation [sic] unnecessarily and so, for example, if the prospective DPO is on a 28-day work/leave cycle they may be allowed to attend the Simulator/Advanced course after one period of sea service. However approval to attend should be sought from the training centre [sic] and/or Institute. (The Nautical Institute, 2012)

As demonstrated, this section either ties the successful gaining of DP experience to being on a vessel regardless of if DP is utilized, or this section mistakenly presumes that DP is engaged continuously on every DP-equipped vessel.

The imprecise definition of DP experience by the Nautical Institute was captured in the previously discussed IMCA M 117, Rev. 1. As previously discussed, this document speaks highly of the importance of experience in the training of DPOs. However, this guidance is less than precise when detailing how the Nautical Institute scheme defines experience:

> Documented confirmation of a minimum of six months supervised DP watchkeeping, dependent upon the level of certification sought, in an approved DP logbook from the Master/OIM and that the above training programme [sic] has been followed and completed, will result in the issue of a DP certificate from an approved body. (The International Marine Contractors Association, 2006)

The definition was certainly not clarified by the instructions in the Nautical Institute's logbook of the time. Called the "A6 Blue logbook," the portion of this logbook that describes the Nautical Institute's scheme requirements only states that the individual needs to "satisfactorily complete required supervised D.P. [sic] operations." Subsequently, this logbook includes the following note, "Also, due to operational requirements, it may not be possible to complete fully the exercises and utilise [sic] all of the controls listed below, in the time available. In that case a note should be made and the watchkeeper required to complete this part of the log book [sic] by the end of the six month period [sic]." Compounding this point is the construct of the logbook tables which do not ask the DPO or prospective DPO to list what days they are on DP; instead, the logbook requests the DPO to list the date they joined the vessel and the date they left the vessel (The Nautical Institute).

Considering these references, it is easy to see how some industry participants did not understand the metric for measuring DP experience.

Over the course of the following years, the Nautical Institute published two other logbooks that repeated this style of experience tracking. These logbooks were referred to by the color of their covers and their size. Together these are referred to as the "A6 Blue/Green log books" [sic].

In 2012 the Nautical Institute started making a series of changes to its DPO Certification Scheme, the scheme requirements, and the materials accompanying the scheme.

One of the bigger changes was the printing of a new logbook which prospective DPOs started to use in 2013. Referred to as the "A5 Black" logbook, because of the size and color of the cover. This book corrected the assumption that a DPO or prospective DPO was operating the vessel on DP for the entirety of their, trip, hitch, or time onboard via a new layout which required the DPO or prospective DPO to not only list the day they joined and left the vessel, but to also list the time period(s) within this hitch when the vessel left port, and the number of DP days during these trips (The Nautical Institute, 2013)

It is also important to note that this new definition of the experience requirement is included in this logbook without references to the six-month period (The Nautical Institute, 2013). Without question these changes better defined what experience was acceptable to the Nautical Institute.

Keeping pace with the above-described industry changes regarding continuous revalidation of certificates, the Nautical Institute started printing an expiration date on their certificates in 2012. Subsequently, in 2015, the started to process of revalidation applications. While other revalidation criteria was put forward between 2012 and 2015 (The Nautical Institute, 2012), the Nautical Institute ultimately settled on a revalidation requirement of 150 days of DP sea service within five (5) years (The Nautical Institute, 2018).

Within this system, DPOs who had accumulated some days of DP sea service, but not the full 150 days of required experience, were required to complete the simulator course and 30 days of DP sea service. If a DPO has zero days of DP sea service during the last five (5) years, then the Nautical Institute requires the DPO to take the simulator course and complete 60 days of DP sea time (The Nautical Institute, 2018).

For revalidation purposes, the Nautical Institute allows DPOs to record their experience in any of the Nautical Institute logbooks or an IMCA logbook (The Nautical Institute, 2018). This does cause some problems because the IMCA logbook asks users to list how many DP hours they accrue per hitch, while the Nautical Institute measures experience gathering in days. As a crude workaround, the Nautical Institute states, "[t]he hours recorded in an individual's IMCA logbook will be divided by 2 to get the number of DP

days that the person has obtained in the last five years" (The Nautical Institute, 2018). To further help define, the Nautical Institute provides the following formula:

> (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. (The Nautical Institute, 2018)

Obviously, this causes problems in determining if a DPO has gained the requisite amount of experience to revalidate their DPO certificate. For example, a DPO who records one (1) day of 12 hours of DP watchkeeping during a 28-day hitch and a six (6) day period at sea could be awarded the equivalent of six (6) days of DP sea service.

Alternatively, the Nautical Institute has introduced a Revalidation Course. This course, if completed prior to 2020, absolves the DPO of needed to complete any DP sea service for a single five (5) year period of revalidation. After that date, an indeterminant amount of sea service days will be required to be completed. This course consists of 34 hours of simulator-based instruction of no more than four (4) DPOs (six (6) with Nautical Institute auditor approval) per one (1) simulator and one (1) instructor. (The Nautical Institute, 2018). By completing removing the experience-gathering requirement, the course challenges the industry's notions of what is required to gain or revalidate a certificate.

Also changed during 2015 was the Nautical Institute's experience-gathering requirement for prospective DPOs, decreasing the amount of Sea Time that is required from 210 days of experience gathering to 120 days of experience; while doubling the amount of time per day that must be spent on DP from one (1) hour to two (2) hours. (The Nautical Institute, 2018)

Part of the scheme modernization process also included the October 2015, publishing of further guidance on how its A6 logbooks should be completed. This guide states the following:

> There has been some misunderstanding in regard to the dates entered in the logbook for joining and leaving the DP vessel. The dates recorded in the logbook should only be for the time the vessel was undertaking DP Operations. The logbook should not be used as a seaman's book or discharge book.
>
> Each entry must have both "Joined" and "Left" dates, otherwise it will not be counted towards your required DP experience. You are also required to only enter the dates on which you operated the DP system aboard of the vessel. (The Nautical Institute, 2015)

In 2015, yet another Nautical Institute logbook was released. Called the A5 Grey Logbook, this book further refined the sea time collection method, requiring the DPO or prospective DPO to list the date they joined the vessel and the date they left the vessel and subsequently listing each individual day that was recorded as a DP sea service day along with the hours that were recorded on DP for that day (The Nautical Institute, 2015).

As these changes were being made, the Nautical Institute also changed how this experience was validated. The Nautical Institute had always required a letter from the vessel owner confirming the DP experience. Prior to the changes in their scheme, the Nautical Institute had published a template sea service letter that directed the vessel operator to list for each sea-going period the date the DPO or prospective DPO joined

the vessel, left the vessel, and the number of days within this period on DP. Later, the Nautical Institute issued a new template which required the company to list each day of DP experience that was recorded.

## DNV GL.

In 2013, the standards for another DPO certification scheme were released by DNV GL. This scheme employed a different methodology than the Nautical Institute scheme in that it did not require experience, when first introduced. One write-up of the scheme, produced by the first center accredited to conduct the courses and assessments associated with the scheme, put the decision this way, "[a]ccording to the requirements given by DNV, anybody will be allowed to take the exams needed to obtain a DNV DPO certificate, regardless of prior knowledge. However, the level of knowledge and skills needed to pass the exams is so high, that this is only recommended for very experienced DPOs" (Kongsberg Maritime Training Grilstad).

DNV GL's concept is obviously novel and in its pure form, it was also short lived. After industry input, DNV GL decided their standards for auditing a DPO certification scheme needed an experience-gathering component. This change was embodied in the publishing of the Recommended Practice for "Certification Scheme for Dynamic Positioning Operators" (DNVGL-RP-007:2014-04). This guidance noted that:

> Sea-time is considered an important element in competence development by the industry and should be part of a certification scheme. It allows the prospective DPO to translate the competencies acquired in the classroom and on the simulator to real-world operations and hone their DP abilities through hands-on experience and observational learning. (DNV GL, 2014)

As the DNV GL Recommended Practice seeks to develop guidance for DPO certification schemes that are tailored to multiple different types of DP operations, the document does not set a hard and fast rule for how much experience should be required. Instead, the guidance states:

> The duration of sea-time is determined by the time it takes to complete all tasks as defined by the scheme of which a minimum of 270 hours should be spent at the DP-desk under DP control.
>
> For specific activities with less frequent use of DP, the scheme should define feasible criteria to enable them to meet sea-time and operational requirements such as the number of operations to be performed on board. (DNV GL, 2014)

The DNV GL does not specify over what period these 270 hours needs to be acquired, except to say that the certification process should be completed within five (5) years. However, it is unknown how many hours a prospective DPO is allowed to record on a single day of DP service.

The DNV GL Recommended Practice does not have stringent revalidation requirements. Instead, the document directs that revalidation should be completed every three (3) to five (5) years and should be contingent on refresher training, the passage of assessments and "[d]ocumented evidence of twelve months of seagoing service in total during the preceding five years, performing DPO duties." (DNV GL, 2014)

As a standard utilized to audit training providers, the DNV GL scheme does not have a set logbook. Instead, the Recommended Practice says the following, "[t]he scheme must use a common format to log achievements, experiences and on board training activities (if applicable) during sea time. The log-entries

should be signed off by a certified DPO." (DNV GL, 2014). Kongsberg, the only company which has been audited and approved by DNV GL issue DPO Certificates based upon the DNV GL standard, has developed a sheet which can be downloaded from their website by DPOs or Prospective DPOs who need to track their experience gathering (Kongsberg). Like the IMCA logbooks, this sheet only requires the user to list the date they joined and left the vessel and the number of hours the vessel was on DP during this time. The DNV GL scheme does not require the employer to confirm this time via a sea service letter.

## OSVDPA.

Initiated in 2016, after a developmental period of two (2) years, the OSVDPA had the benefit of evaluating the above-described evolution and deliberation; its experience-gathering requirements and the materials utilized to document this experience reflect this history.

Reflecting the fact that most of the industry measures experience based upon days, while others—such as IMCA and DNV GL—track experience measured in hours, the OSVDPA included a dual layer experience requirement requiring that DPOs and Prospective DPOs gain certain amounts of both hours and days of DP experience. Specifically, the OSVDPA utilizes the following definitions:

> **Sea Time.** A day-based measurement of DP experience accrued when a DPO or Prospective DPO is on watch while the vessel is conducting auto positioning operations, auto heading operations (including DP or independent joystick-based autopilot), independent joystick operations, or other operations where the DP system is engaged for at least one (1) hour during a 24-hour period. All Sea Time recorded by a Prospective DPO must be supervised and signed off by a certified DPO or the Master of the Vessel.
>
> **Practical Experience.** An hour-based measurement of DP experience accrued when a DPO or Prospective DPO is at the DP controls for at least one (1) hour during a 24-hour period while the vessel is conducting auto positioning operations, auto heading operations (including DP or independent joystick-based autopilot), independent joystick operations, or other operations where the DP system is engaged. Up to six (6) hours of Practical Experience can be logged during a 24-hour period. All Practical Experience recorded by Prospective DPOs must be supervised and signed off by a certified DPO or the Master of the Vessel. (The Offshore Service Vessel Dynamic Positioning Authority, 2018)

As seen, this standard differs, in a few important ways from the Nautical Institute. Specifically, the OSVDPA allows for periods of less than two (2) hours on DP to count towards the relevant experience requirement. Additionally, the OSVDPA's definition specifies that the DPO or Prospective DPO must be on watch when the vessel is on DP, not simply that experience can be accrued, "any day when DP operations are undertaken by the vessel." (The Nautical Institute, 2018). The hour-based requirement is even more stringent, requiring the DPO or Prospective DPO be at the DP console in order to record time.

In terms of required experience, the OSVDPA requires that Prospective DPOs accumulate 90 days of Sea Time and 270 hours of Practical Experience to earn a DPO certificate. To revalidate an OSVDPA DPO Certificate, the OSVDPA requires a DPO accumulate 150 days of Sea Time and 450 hours of Practical Experience. (The Offshore Service Vessel Dynamic Positioning Authority, 2018). As such, these requirements are generally comparable with industry standards.

Those looking to revalidate a DPO Certificate that do not have the above-listed amount of Sea Time or Practical Experience are provide two (2) options. First, the OSVDPA offers Additional Revalidation Activities for those that have recorded some Sea Time and Practical Experience in the last five (5) years

but not the full 150 days of Sea Time 450 hours of Practical Experience. The Additional Revalidation Activities route requires the DPO to (in this order) pass the Phase 3 Assessment, complete 30 days of Sea Time and 60 hours of Practical Experience, and subsequently pass the Phase 4 Assessment. For those that have not accrued any Sea Time or Practical Experience in the last five (5) years, the OSVDPA also offers Complete Revalidation Activities whereby a DPO is required to (in this order) take the Phase 3 (Simulator) Course, pass the Phase 3 Assessment, complete 30 days of Sea Time and 60 hours of Practical Experience, and pass the Phase 4 Assessment. As demonstrated, all pathways require at least some experience to be gained before revalidation. (The Offshore Service Vessel Dynamic Positioning Authority, 2018).

To record Sea Time and Practical Experience, the OSVDPA publishes two (2) logbooks. The OSVDPA LB-1-CV, the OSVDPA In-Scheme Logbook (Current Version) and OSVDPA LB-2-CV, the OSVDPA Post-Scheme Logbook (Current Version). Like the most recent versions of the Nautical Institute logbooks, these logbooks require the DPO or Prospective DPO to list when they joined and left the vessel for each hitch and subsequently list the date that each unit of Sea Time and Practical Experience were recorded.

The OSVDPA also requires that DPOs or Prospective DPOs have their experience validated by the vessel operator. Specifically, this process works one (1) of three (3) ways. First, if the DPO or Prospective DPO's employer is enrolled in the OSVDPA scheme, that is they have been officially approved by the OSVDPA, they can issue a sea service letter similar to what the Nautical Institute requires. Conversely, if the DPO or Prospective DPO's vessel operator has not been approved by the OSVDPA, it is required to complete a standardized form. This form provides much greater detail on each hitch that was completed and the specific days that were spent on DP during that time. Finally, DPOs or Prospective DPO grandfathering into the OSVDPA Certification Scheme can utilize an orginial sea service letter that meets the requirements of the scheme from which they are grandfathering from (The Offshore Service Vessel Dynamic Positioning Authority, 2018).

From all the above, it is obvious that the DP industry highly values the gathering of DP experience. Additionally, it is interesting to note that when some have strayed from the inclusion of an experience-gathering requirement, i.e. the initial DNV GL scheme, they have been pulled back by industry pressure. It will be interesting to see if similar changes befall the Nautical Institute's Revalidation Course.

## OCIMF.

In 2016, the Oil Companies International Marine Forum (OCIMF) published a document intended to manage DP risks by specifying minimum standards. The document does not heavily discuss experience requirements for DPO accept to say the following. It is presumed that this instruction is speaking to the experience of previously certificated DPOs.

> Technical operators should make sure that DPOs receive classroom instruction or hands on training on the vessel's specific DP system equipment. . . . Companies should develop criteria for determining which personnel are considered experience personnel. This could include a minimum requirement of at least two years on a vessel where manual manoeuvers [sic] are frequently conducted. Companies may also consider satisfactory completion of shore-based simulator/manoevring [sic]training, as well as practical experience on board (Oil Companies International Marine Forum, 2016)

## Validation of DPO Experience Requirements.

As demonstrated above, experience gathering is vitally important for certification programs both for initial certification and revalidation requirements. And while the OSVDPA—among other DPO certification schemes and DP guidance bodies—believe that the passing of assessments is required to prove that

competency was gained from this experience, the OSVDPA believes that those assessments do not replace the need to ensure experience was gained. In fact, the OSVDPA believes that because experience gathering is one of the primary areas of importance in the training of a DPO, the security of this experience is one of the more important validations a DPO certification scheme performs.

Unfortunately, on this front, the OSVDPA feels the existing industry standards are lacking greatly. As noted—or not noted—above, the current and previous versions of IMCA M 117 do not speak to how sea time should be validated—or even if a DPO certification scheme does perform this validation. Similarly, verification of sea time is not mentioned in DNVGL-RP-007:2014-04.

As demonstrated above, the Nautical Institute has always required a letter from the vessel operator confirming that the sea time was recorded. Also, as demonstrated, the standards for these letters have improved. However, considering the importance of experience in the development of a DPO, the OSVDPA believes that independent validation of the experience claimed by a DPO or Prospective DPO is required.

For this reason, the OSVDPA developed a requirement that at least some of experience claimed on every application be validated by reviewing the vessel's history against data found on Automatic Identification System (AIS) tracking services.

As most know, AIS is a tracking system that provides a vessel's unique identification, position, heading, course, and other information (if entered). The technology utilizes standard VHF transceiver in tandem with GPS receivers. Additionally, AIS monitoring is also done by satellites which has allowed for a greater coverage area away from shore-based locations and better deconflicting of the AIS signatures from a collection of vessels in close proximity.

Use of AIS is mandated by Regulation 19 of the IMO's *International Convention for the Safety of Life at Sea (SOLAS)* for vessels over 300 gross tons on an international voyage and passenger vessels of any size. Additionally, 33 C.F.R. 164 requires all vessels of more than 1,600 gross tons, foreign vessels making calls in U.S. ports, and most other commercial or passenger vessel. As such, most vessels that the OSVDPA reviews have data on most AIS-based ship tracking services.

Utilizing AIS for this purpose, allows the OSVDPA to independently validate if the experience claimed by the DPO or Prospective DPO and ensures the OSVDPA accurately enforces its scheme requirements.

This process is not perfect; however, it is far better than not attempting to independently validate this claimed experience. As a result, the OSVDPA has informed numerous DPOs and Prospective DPOs that they would be required to accrue more experience before being allowed to sit for the OSVDPA assessment and pending passage of that assessment be awarded a DPO certificate.

The practice utilized by the OSVDPA during this validation process is described below.

When an application for a DPO certificate is submitted to the OSVDPA, the OSVDPA utilizes an internal form to track the application. Referred to as Form IP-4-CV, the Checklist for Approval of DPO Certificate Applications (Current Version), this form mainly tracks the non-experiential aspects of the application, such as course completion certificates, assessments, and other credentials needed to complete the scheme.

The OSVDPA also completes a Form IP-4A-CV, the Checklist for Approval of DPO Certificate Applications (Hitch Validation Appendix) (Current Version) for every hitch included in the DPO or Prospective DPO's application. This form is composed of two (2) sections. First, is the administrative information that is collected for each hitch. This information helps the OSVDPA determine if the

experience claimed meets the OSVDPA's standards and assists the OSVDPA in monitoring the quality of the information it is receiving. The bullet points below describe the administrative information requested:

- Hitch: I.e. the first eligible hitch is labelled "Hitch 1."
- Phase: The phase of the scheme when this hitch recorded (the form also instructs the official completing the form to insert "Reval" for hitches recorded during revalidation efforts).
- Grandfather: If the hitch was recorded while the DPO or Prospective DPO was part of another scheme and is now grandfathering into the OSVDPA DPO Certification Scheme.
- Sea Service Letter:
- Serial Number: The OSVDPA inserts a unique identifier for every Form IP-4-CV it completes:
- Vessel Name:
- Vessel on Class Society database: This section has three (3) boxes: "included," "[Accepted Unclassed Vessel]," and "Class not Required." This last box is included because the OSVDPA's generally accept experience for grandfathering purposes if previous scheme accepted this time.
- DP Class:
- IMO or Official Number:
- Call Sign:
- MMSI:
- Logbook Signer's Name:
- Signature Validated: If the OSVDPA has record of the logbook signer's signature and has validated the logbook signature against this signature.
- Vessel Stamp Validated:
- Requires Enhanced Verification: An OSVDPA-specific activity required for self-signed logbook.
- [Enhanced] Verification Submitted: See above.
- [Enhanced Verification] Method: See above.
- Signers Position:
- License or Certificate Type:
- Signer's License or Certificate Number:
- Issuing Authority:

Second, and more importantly, Form IP-4A-CV tracks the amount of Sea Time and Practical Experience claimed in the logbook, sea service letter, and independently validated by the OSVDPA. The structure of this tracking area also allows for easy comparison between these three (3) numbers.

In completing the experience tracking portion of the form, the OSVDPA writes when the DPO or Prospective DPO joined and left the vessel. Subsequently, the OSVDPA records how many days of Sea Time and hours of Practical Experience are recorded on both the logbook and the sea service letter. Finally, the OSVDPA lists each date during the hitch, and if this day was recorded as Sea Time in the logbook, and if Practical Experience was recorded on this date as well. In recording this information, the OSVDPA checks the appropriate box next to the date and if that date is specifically listed as a date the vessel was on DP on the logbook, sea service letter, or both. Conversely, the OSVDPA will draw a vertical line through all applicable boxes to denote a range of dates that were claimed as being on DP.

Once recorded, the OSVDPA compares this information against an AIS-based ship-tracking service. Unfortunately, these services do not list when the vessel was on DP. As such, the OSVDPA utilizes the available information to determine if it was plausible that the DPO or Prospective DPO accrued experience during this time. Specifically, the OSVDPA will first review when the vessel left and returned to ports, harbours, anchorages, or was otherwise not underway. If more precise validation is required, the OSVDPA will review the AIS data on an hour-by-hour basis to determine when the vessel was offshore, underway,

and stationary, and/or moving at a speed indicative of DP operation. Examples of the relevant portions of some of these experience checklists are found in Illustration 1 and Illustration 2.

The OSVDPA does not intend to review every day of Sea Time from every hitch recorded. Instead, the OSVDPA selects a few hitches from throughout the period covered in the application and checks to see if the rate of acceptable Sea Time dates to total claimed Sea Time days is sufficient to meet the standard.

For example, if the OSVDPA were to validate a hypothetical application that claimed (with sea service letter support for) 300 Sea Time days claimed over 20 hitches. The OSVDPA would select no less than five (5) of these hitches containing, in total, no less than 38 days of claimed Sea Time. The OSVDPA would attempt to spread these days out over the range of vessels, vessel operators, Masters or signing DPOs, and period covered by the application.

If under this scenario, the OSVDPA were to find that these hitches contained less than approximately 22 days of Sea Time, the OSVDPA would be concerned that this rate, extrapolated over the entire 20 hitches covered in the logbook, would not meet the Revalidation requirement. As such, the OSVDPA would then compare additional hitches in the DPO's logbook against AIS data until it was confident that the DPO had meet the experience requirement for Revalidation. Some samples of this validation are listed below.

Illustration 1 displays the AIS history for part of a hitch that was submitted to the OSVDPA. As seen, the vessel was out of port for only two days during this period. However, logbook and sea service letter showed respectively that 14 and 15 days of sea time were recorded.

Illustration 3 provides a sample logbook that was submitted to the OSVDPA and Illustration 4 provides the sea service letter confirming the data contained in the logbook. However, Illustrations 5 and 6 provide examples of map-based AIS reports demonstrating the vessel not leaving the dock during part of this period. All this information is captured on the OSVDPA internal report, found in Illustration 7.

## Illustration 1: AIS logs.

| Position Label | Event Name |
|---|---|
| 5:10:39 CDT | Departed Express Weld North (613), Fourchon, LA |
| 5:11:29 CDT | Arrived Grand Isle Shipyard, (609 & 610), Fourchon, LA |
| 6:55:19 CDT | Departed Grand Isle Shipyard, (609 & 610), Fourchon, LA |
| 6:56:49 CDT | Arrived Express Weld North (613), Fourchon, LA |
| 2:33:29 CDT | Departed Express Weld North (613), Fourchon, LA |
| 3:03:19 CDT | Passed Martin Energy Services #16 (501) Fourchon LA |
| 3:07:39 CDT | Passed Halliburton Energy Services (500) Fourchon LA |
| 3:27:29 CDT | Arrived C-Port (400) Fourchon, LA |
| 7:49:20 CDT | Departed C-Port (400) Fourchon, LA |
| 7:56:19 CDT | Arrived Offshore Support - Newpark (353) Fourchon LA |
| 3:39:49 CDT | Departed Offshore Support - Newpark (353) Fourchon, LA |
| 3:46:29 CDT | Arrived C-Port (400) Fourchon, LA |
| 3:04:38 CDT | Departed C-Port (400) Fourchon, LA |
| 4:01:35 CDT | Passed Port Fourchon Jetties |
| 4:04:49 CDT | Unknown Departed Port: Port of Fourchon, Louisiana |
| 4:04:49 CDT | Passed Sea Buoy 1 & 2, Fourchon, LA |
| 5:17:49 CDT | Passed Sea Buoy 1 & 2, Fourchon, LA |
| 5:19:28 CDT | Unknown Arrived at Port: Port of Fourchon, Louisiana |
| 5:20:49 CDT | Passed Port Fourchon Jetties |
| 5:52:49 CDT | Passed Halliburton Energy Services (500) Fourchon LA |
| 6:01:58 CDT | Arrived Halliburton Energy Services (500) Fourchon LA |
| 9:50:06 CDT | Departed Halliburton Energy Services (500) Fourchon, LA |
| 9:54:19 CDT | Passed Halliburton (313) Fourchon, LA |

Illustration 2: Internal Verification form for experience detailed in Illustration 1.

**Sea Time and Practical Experience Validation Tracker:**

**Days on Logbook:** 14 **Hours on Logbook:** — **Days on Sea Service Letter:** 15 **Hours on Sea Service Letter:** —

| Day | Hours | Logbook | Letter | Validated | Day | Hours | Logbook | Letter | Validated |
|---|---|---|---|---|---|---|---|---|---|
| 20 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 21 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 22 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 23 | 2 | ☐ | ☐ | ☒ | | | ☐ | ☐ | ☐ |
| 24 | 2 | ☐ | ☐ | ☒ | | | ☐ | ☐ | ☐ |
| 25 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 26 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 27 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 28 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 29 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 30 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 31 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 1 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| 2 | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |
| | | ☐ | ☐ | ☐ | | | ☐ | ☐ | ☐ |

**Total Days Validated:** 2 **Total Hours Validated:** 4 **Validation Method** VER [redacted]

Illustration 3: Sample logbook received by OSVDPA.

**DATES WORKED ON DP**

| From | To | No of days | Code* |
|---|---|---|---|
| 12 Jan 2016 | 27 Jan 2016 | 16 | SU |
| | | | |

Illustration 4: Sea service letter confirming entries from Illustration 3.

| Vessel Name | IMO Number | DP Class | Tons | Position | From | To | Days on DP |
|---|---|---|---|---|---|---|---|
| [redacted] | [redacted] | 2 | 89 | DPO/Captain | 12-01-2016 | 27-01-2016 | 16 |

Illustration 5: Map-based verification of data in the logbook from Illustration 3.

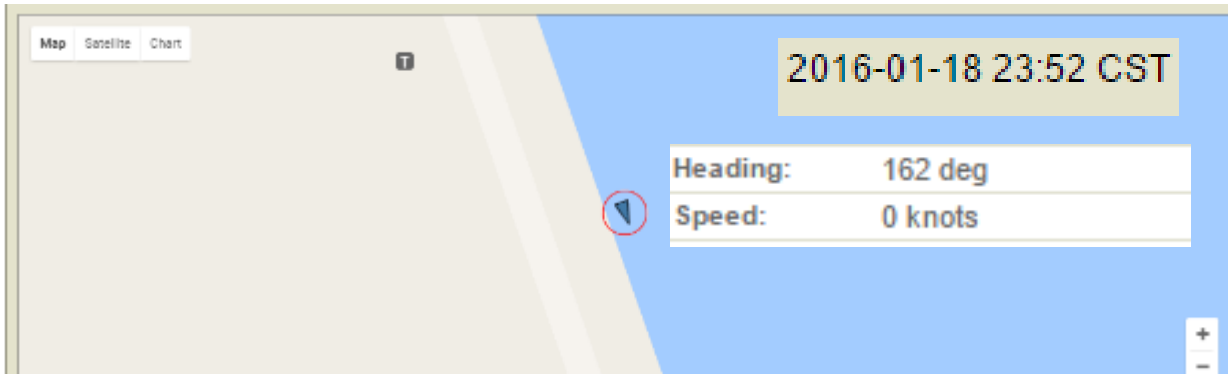



Illustration 6: Map-based verification of data in the logbook from Illustration 3.

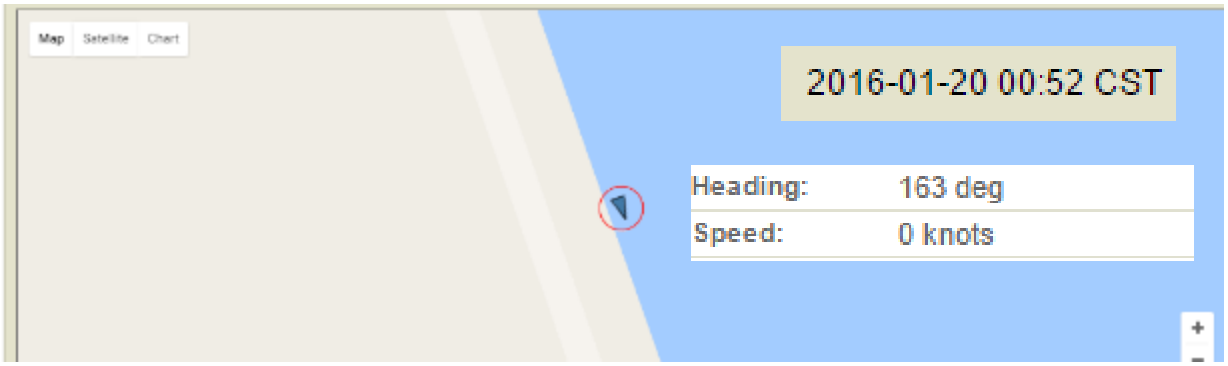
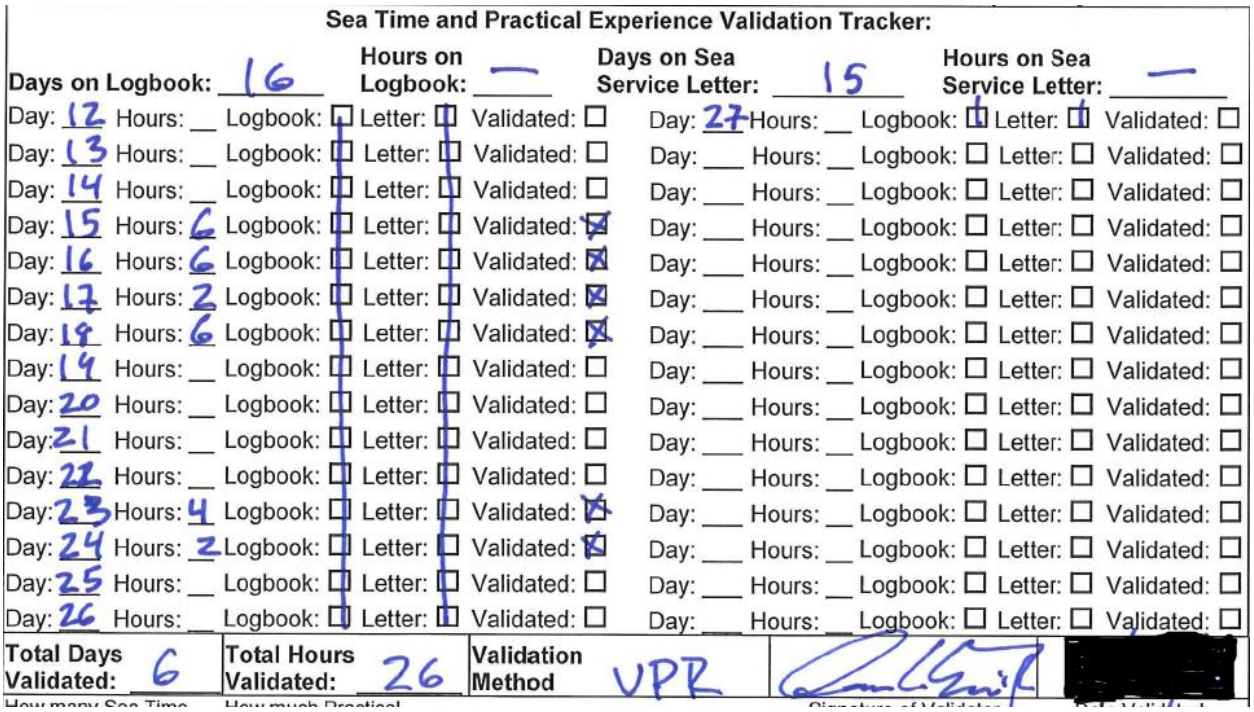



Illustration 7: Internal Verification form for experience detailed in Illustration 3.



**Sea Time and Practical Experience Validation Tracker:**

Days on Logbook: 16 Hours on Logbook: — Days on Sea Service Letter: 15 Hours on Sea Service Letter: —

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Day: 12 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: 27 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 13 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 14 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 15 | Hours: 6 | Logbook: ☐ | Letter: ☐ | Validated: ☒ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 16 | Hours: 6 | Logbook: ☐ | Letter: ☐ | Validated: ☒ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 17 | Hours: 2 | Logbook: ☐ | Letter: ☐ | Validated: ☒ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 19 | Hours: 6 | Logbook: ☐ | Letter: ☐ | Validated: ☒ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 19 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 20 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 21 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 22 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 23 | Hours: 4 | Logbook: ☐ | Letter: ☐ | Validated: ☒ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 24 | Hours: 2 | Logbook: ☐ | Letter: ☐ | Validated: ☒ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 25 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |
| Day: 26 | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ | Day: — | Hours: — | Logbook: ☐ | Letter: ☐ | Validated: ☐ |

Total Days Validated: 6 | Total Hours Validated: 26 | Validation Method VPR | [redacted]

## Results of the OSVDPA's Sea Time Validation.

In the OSVDPA's opinion, the above-described validation strategy is not burdensome, especially when weighed against the importance of experience in competency development and skill fade mitigation. The OSVDPA has been dismayed with the results it has found during this validation, as demonstrated above.

To highlight the poor results the OSVDPA has received, the OSVDPA drew a significant sample of the hitches it was provided and did a statistical analysis of the results.

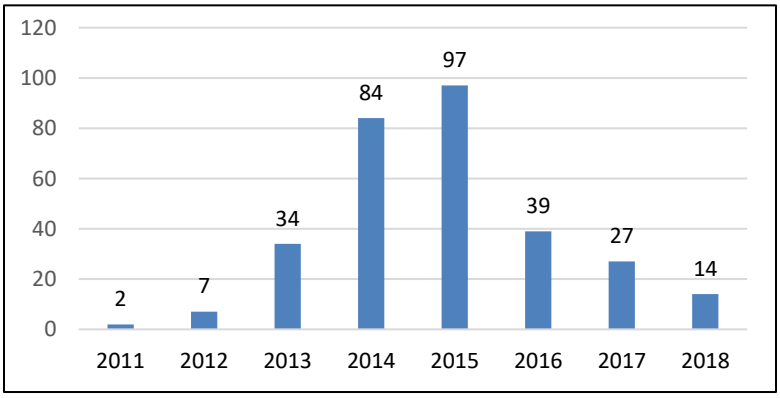
In total, the OSVDPA drew 428 hitches for inclusion in the analysis. This total was chosen because it was approximately 15 percent of the hitches submitted to the OSVDPA and it was theorized that this amount would provide a significant, yet not unwieldy data set. These hitches had been submitted by 33 mariners who had recorded hitches while working for 21 different vessel operators on 75 different vessels. For each hitch, the OSVDPA recorded, the certificate the mariner was applying for (Class A, B, or C, initial, or revalidation), the class(es) of vessel(s) worked, the dates onboard, the dates on the logbook, the dates on the sea service letter, the days validated on AIS, if the logbook and sea service letter recorded individual days or ranges of dates, who signed the logbook, and if the logbook was stamped.

Because of the OSVDPA's newness in the industry, and the fact that the Prospective DPOs who entered the OSVDPA in Phase 1 have not matriculated to the point of submitting their DPO application to the OSVDPA yet, 168 of these hitches were submitted as part of a revalidation or upgrading application, in other words by an individual that has previously been awarded a DPO certificate. Almost all the others were submitted by those grandfathering into the OSVDPA while seeking their initial DPO certificate. As such, all but four (4) of the hitches in the data set were recorded on logbooks produced by the Nautical Institute or IMCA. Similarly, many of the sea service letters the OSVDPA received in its efforts to validate this experience were also reproductions of letters that were submitted to the Nautical Institute.

Ten hitches were excluded from the analysis due to duplicate serial numbers on the Form IP-4A-CVs, illegible information on the forms, or other administrative concerns. Thus, the actual sample size was 418 hitches. Additionally, 114 hitches were discarded because a corresponding sea service letter was not received, there was not data contained on the vessel tracking system, or the hitch had not been validated because the DPO had submitted more hitches than the OSVDPA had needed to validate to prove he or she had met the applicable standard, leaving a total of 304 hitches for the final analysis.

If measured by the "joined vessel," "left vessel" dates, these hitches covered 6,657 days from 2011 through 2018, specifically in the following distribution:

Chart 1: Hitches Recorded per Year (by "Left Vessel" Date).




*Data from OSVDPA data set based on sample of hitches submitted to the OSVDPA.

This profile seems reasonable when compared to when the OSVDPA was founded, its growth, the offshore market, and mariner's need for certification or revalidation (i.e. mariners who received their certificate or entered a DPO certification scheme recently are not going to be applying in 2018). This profile also means that the data is relevant to the broader community because those who were recording hitches in 2014 and 2015 will need to have those hitches revalidated at the latest in 2019 or 2020. Moreover, with the downturn reducing opportunities for experience in the latter half of the decade, mariners are going to be depending on the time they accrued in 2014 and 2015.

Drilling down, within the 6,657 days between the "joined vessel" "left vessel" dates, 4,777 days, or 72 percent of the eligible days, were claimed as Sea Time days. Even more interesting was the fact that 4,881 days were claimed as DP days on the sea service letters that were submitted to the OSVDPA as validation of this Sea Time. Meaning 104, or two (2) percent, more days were found on the sea service letters than on the logbooks.

More concerning is that when the OSVDPA attempted to independently validate these Sea Time days against the data contained on AIS-based vessel tracking systems, the OSVDPA found that only 3,516 days of Sea Time should have been recorded. That is a difference of 1,235, or 26 percent, fewer days than were recorded in the logbooks and 1,355, or 28 percent, fewer days than on the sea service letters. Again, this total was is after hitches that could not be validated on AIS or other independent means were discarded. Additionally, as stated above, AIS analysis is useful but limited; therefore, the total of days in which DP was used is probably even less than this amount. See the table and chart below for more information.

Table 1: Amount of Experience Claimed Verses Experience Validated.

| **Category of Experience** | **Amount** | **Context** |
|---|---|---|
| Total days onboard: | 6,657 | |
| DP Sea Time claimed on logbook | 4,777 | 72 percent of total days onboard |
| DP Sea Time validated on sea service letter | 4,881 | 73 percent of total days onboard |
| DP Sea Time validated by AIS | 3,516 | 53 percent of total days onboard<br>74 percent of days claimed on logbook<br>72 percent of days claimed on sea service letter |

*Data from OSVDPA data set based on sample of hitches submitted to the OSVDPA.

To put these amounts in context, an application for an initial Nautical Institute DPO Certificate claiming—with validation from their employer—the minimum 120 days of DP sea time, can be assumed to contain only 89 days of DP. Similarly, a DPO claiming—with company validation—to have accumulated the minimum of 150 days of DP sea time has only accumulated 111 days of experience.

The OSVDPA also reviewed the data on a year-by-year basis to examine the change in reporting practices has changed over time.

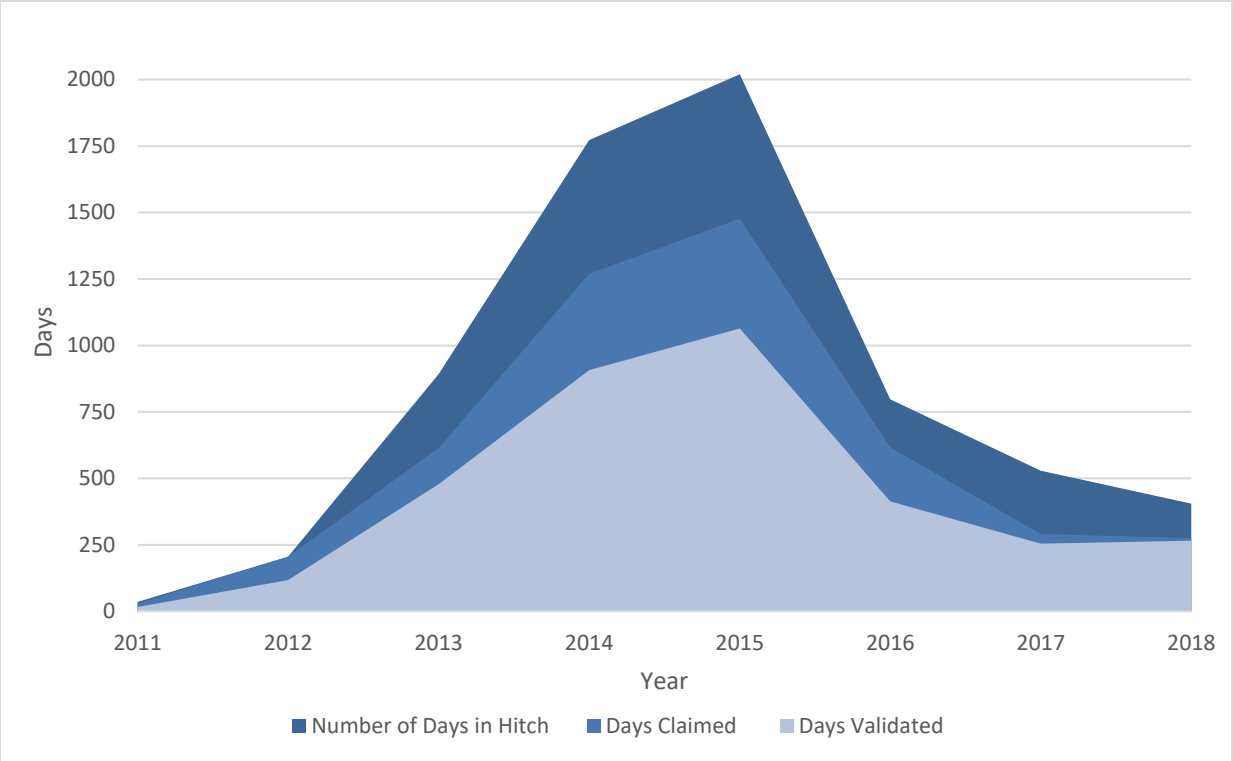
Table 2: Amount of Experience Claimed Verses Experience Validated by Year.

| Year | Hitches | Days on Hitch | Days on logbook | Days on Sea Service Letter | Days on AIS | Difference from Logbook | | Difference from Sea Service Letter | |
|---|---|---|---|---|---|---|---|---|---|
| 2011 | 2 | 35 | 29 | 29 | 16 | 13 | 45% | 13 | 45% |
| 2012 | 7 | 205 | 205 | 205 | 117 | 88 | 43% | 88 | 43% |
| 2013 | 34 | 893 | 614 | 603 | 479 | 123 | 20% | 115 | 19% |
| 2014 | 84 | 1,772 | 1,269 | 1,379 | 907 | 362 | 29% | 477 | 35% |
| 2015 | 97 | 2,020 | 1,477 | 1,479 | 1,064 | 399 | 27% | 410 | 28% |
| 2016 | 39 | 797 | 617 | 589 | 414 | 203 | 33% | 173 | 29% |
| 2017 | 27 | 529 | 291 | 282 | 254 | 37 | 13% | 29 | 10% |
| 2018 | 14 | 405 | 275 | 315 | 265 | 10 | 4% | 50 | 16% |
| **Total** | **304** | **6,657** | **4,777** | **4,881** | **3,516** | **1,235** | **26%** | **1,355** | **28%** |

*Data from OSVDPA data set based on sample of hitches submitted to the OSVDPA.

As seen, reliability does appear to improve. The limited data available from 2017 and 2018 showed a 13 percent and four (4) percent (respectively) variation between logbook and AIS. However, considering the importance the reliability remains certainly too low for the OSVDPA to have confidence in the information it receives without independent verification. Especially when one considers that DPO certification schemes shall continue to receive data recorded in 2016 (one of the statistically least reliable years) through 2021. A more visual representation of the reliability is found in Chart 2.

Chart 2: Amount of Experience Claimed Verses Experience Validated.




*Data from OSVDPA data set based on sample of hitches submitted to the OSVDPA.
**Note. As days on logbook and sea serve letter was so close this chart excludes the sea service letter amount.

The OSVDPA also attempted to determine if certain logbooks or sea service letters were more reliable. The results confirmed that logbooks and sea service letters that the specific days a vessel was on DP are more reliable than those that ask for the DPO or the company to list the periods the DPO or Prospective DPO was onboard and subsequently the number of DP days recorded therein.

Table 3: Amount of Experience Claimed Verses Experience Validated by Logbook and Letter Type.

| Variable | Days on Board | Days on Logbook | Days on Sea Service Letter | Days Validated on AIS | Difference Between Logbook and AIS | Difference Between Sea Service Letter and AIS |
|---|---|---|---|---|---|---|
| Day-Specific Logbook | 1,974 | 925 | 1,010 | 840 | 84 / 9% | 177 / 18% |
| General Logbook | 4,682 | 3,852 | 3,871 | 2,676 | 1,151 / 30% | 1,178 / 30% |
| Day-Specific Sea Service Letters | 2,361 | 1,389 | 1,225 | 1,024 | 354 / 25% | 200 / 16% |
| General Sea Service Letters | 4,295 | 3,388 | 3,656 | 2,492 | 881 / 26% | 1,155 / 32% |
| Full Validation | 1,289 | 539 | 536 | 501 | 38 / 7% | 37 / 7% |

*Data from OSVDPA data set based on sample of hitches submitted to the OSVDPA.

As demonstrated, day-specific logbooks and sea service letters are certainly more accurate than their general counterparts. However, there is still a significant difference between what is recorded in these assets and what was found to be plausible based upon an independent validation of the AIS data.

This data seems to confirm the data presented at the 2017 DP Conference by Mr. Dan Endersby. Mr. Endersby's case study found that a single DP trip had been recorded as incurring 600 hours of DP experience, which translated to 74 days of DP experience. However, independent AIS data found the DPO had accumulated only 35 days of actual DP experience (Endersby, 2017).

## Conclusion and Suggested Best Practices.

As stated, experience is of widely viewed as the most important factor in the training and continued development of DPOs. However, the data presented in this paper demonstrates that the existing methods of validating claimed experience are severely lacking. Being presented with this data, the industry must now decide if it will demand increased validation methods, add other ways to review competency to the validation process, or take other measures to ensure that those who are serving in safety-critical roles have the appropriate competency and experience.

As the industry makes these determinations, the OSVDPA offers the following recommendations which it believes can be utilized by the industry to improve the safety of our industry by the improved quality assurance within the validation DPO certificate applications.

First, certification schemes can include an assessment of a DPO or Prospective DPO's DP knowledge and abilities at all phases of the scheme and during every revalidation. At the very least, such an assessment

proves to be a backstop against those who have not gained or retained sufficient experience. At best, such an assessment proves the individual's experience has enabled him or her to gain or retain the requisite knowledge and abilities.

Second, as evidenced above, there are ways to improve the reliability of logbooks and confirming sea service letters, but—as evidenced in this paper—these resources are fallible and are poor substitutes for independent verification provided by measuring the information in the logbook and sea service letter against actual vessel operation data. Thus, the OSVDPA urges the industry to follow the OSVDPA's lead and install independent means to verify the experience being claimed is accurate.

Similarly, the evidence in this paper appears to demonstrate that improvements in sea service letters have improved the reliability of the data in DPO applications. However, the OSVDPA cautions how far the industry takes this concept. The reader is reminded that outside of OSVDPA's Vessel Operator Enrollment, vessel operators are third parties to DPO certification. Thus, placing overly onerous requirements on these entities could result in unintended consequences. For example, more vessel operators may start completing their sea service letter based upon what data is in the logbook. Such an outlook may only serve to confirm bad data. As such, the OSVDPA again states its belief that independent verification of the vessel's actual operational history to be the best method of experience verification.

Finally, As demonstrated above, the average hitch in this data set is approximately 22 days, DPOs and Prospective DPOs claimed that approximately 16 of these days were spent on DP and AIS data found that approximately 12 of these days appeared to be days it was plausible that the vessel was on DP. The OSVDPA urges the industry to keep these averages in mind—or to develop other metrics—and conduct increased scrutiny when experience is claimed which significantly surpasses these averages.

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