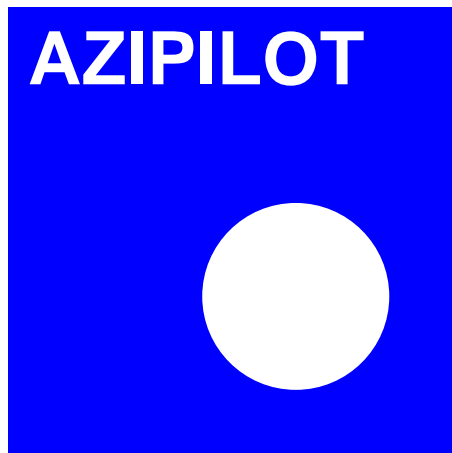


Intuitive operation  
and **pilot** training  
when using marine  
**azimuthing**  
control devices



Report Title:

**Deliverable 4.2:**

**Review of existing operational practice**

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**PUBLISHABLE EXECUTIVE SUMMARY**

The present report contains the main results of the task 4.2 of the AZIPILOT project. The WP4 of the project is specifically addressed to maritime pilots, ship operators/managers, pilot associations and end users and in general all the subjects interested in the operational practice with the azimuthing control devices (ACD). The main aim of the WP4 is to collate, review and audit available material that is relative to the operational of azimuthing control devices when manoeuvring ships in pilotage waters. The outcomes of the work will then be used to improve current techniques and tools also with the involvement of dedicated Authorities and Regulatory Bodies.

The task was focused on the performance of a formal “Task Analysis” with the objective of reviewing the piloting process within the context of ship manoeuvring performance design.

The task was mainly divided in two activities:

- The first one was conducted thanks to the specific help of operators of ADCs namely pilots and ship officers (masters) who were interviewed describing their experience with such systems and pointing out which are the advantages and disadvantages with them, in particular about the training received and the operational situations. The results of the interviews are reported in the relevant section of the present deliverable. The section also contains some statistics relevant to a survey conducted among pilots and ship officers worldwide.
- The second section of the deliverable contains the results of a pilot survey conducted by Port Revel among attendees to their training course. The questionnaire was focused on the ACDs and the evaluation of the training course received about these issues.

The work summarized in this deliverable has been conducted by Port Revel, United Kingdom Maritime Pilots Association and Cons.


## 1 SURVEY AMONG PILOTS WORLDWIDE

The UKMPA (United Kingdom Maritime Pilots Association) performed a survey among the pilots and Pilots Associations all around the world in order to collect some relevant information concerning their experience with ACDs and the way they are trained for the use of such systems. The questions asked can be categorized as follows:

- Pilots using azipods;
- Pilots having training ;
- Pilots provided with guidelines about the use of these systems.

In the following table an overview of the answers received is shown.

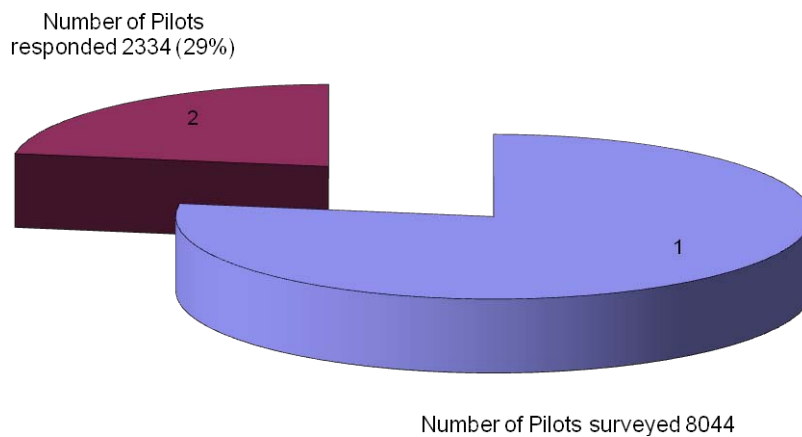
**Table 1 – AZIPILOT survey results**

Port/State	Pilots respondant	Pilots using azipods	Pilots having training	Pilots provided with guidelines
Adelaide	12	12	0	-
Auckland	14	14	14	0
Barrow	2	0	0	0
Belfast	11	11	0	0
Bell Bay Tasmania	4	0	0	0
Boston & Spalding	5	5	0	0
Brisbane	39	39	0	0
Bristol	16	16	0	0
Cairns	12	12	0	0
Cork	12	12	12	0
Cromarty	2	2	0	0
Dover	6	6	6	0
Dundee	3	3	0	0
Geraldton	4	0	0	0
Gironde	21	21	0	0
Gothenburg	24	24	0	0
Great Barrier Reef	30	30	0	0
Great Yarmouth	6	6	0	0
Guatemala	6	6	0	0
Hamburg	75	75	0	0
Holland	438	438	438	0
Japan	640	640	0	0
La Coruna	5	5	0	5
La Rochelle	9	9	0	9
Le Havre	51	51	0	0
London	95	95	0	0
Malta	15	15	0	0
Mildford Haven	15	15	0	0
Marseille/Nice	50	50	0	50
Napier	6	3	3	0
Newcastle NSW	14	0	0	0
Norway	260	260	0	0
Otago	6	6	6	0
Panama	240	240	240	0
Port Walcott	6	0	0	0
Poole	7	7	0	0

<b>Portsmouth</b>	4	4	0	0
<b>Sea of Bothnia</b>	16	16	0	0
<b>SE Wales</b>	14	14	0	0
<b>Shoreham</b>	5	5	0	0
<b>Southampton</b>	47	47	0	0
<b>Sullom Voe</b>	11	11	11	0
<b>Swansea</b>	5	5	0	0
<b>Tasmania</b>	10	10	0	0
<b>Sweden East Coast</b>	30	30	0	0
<b>Sweden W.Coast Halmstad</b>	6	6	6	0
<b>Sweden W.Coast Gothenburg</b>	25	25	0	0
<b>TOTAL</b>	<b>2334</b>	<b>2301</b>	<b>736</b>	<b>64</b>

The survey collects the responses by 2334 pilot on a total of 8044, which represents the 29% of the total, as shown in the following figure.

**Total Responses to Survey**



**Figure 1**

The survey reveals that a great majority of the respondents (98%) usually use azipods, as shown in the following graphic:

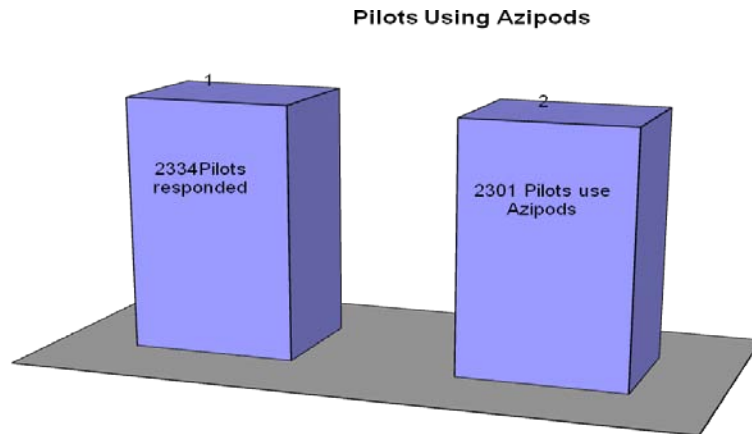


Figure 2

The surprising aspect is that such a great use of the azipods is not supported by a dedicated and appropriate training. In fact, as shown in the following figure, among 2,301 pilots using azipods only 736 of them (representing the 32% of the total of pilots investigated) have received a certain training on that.

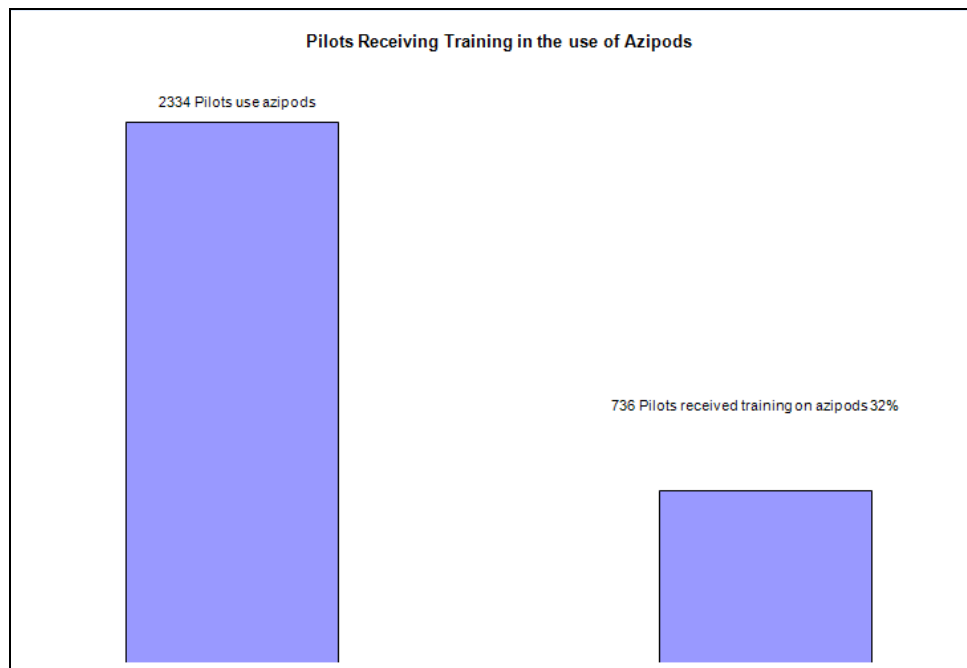
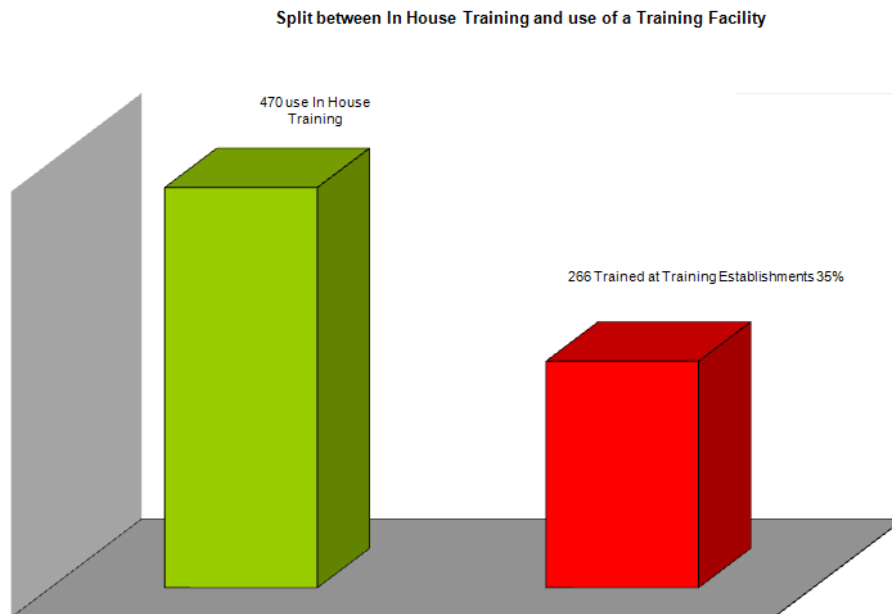


Figure 3

The pilots who declared to have received any training, were asked about the particular type of training received and training course attended. In particular, the question identified two type of training: in-house courses or training provided at dedicated establishments:



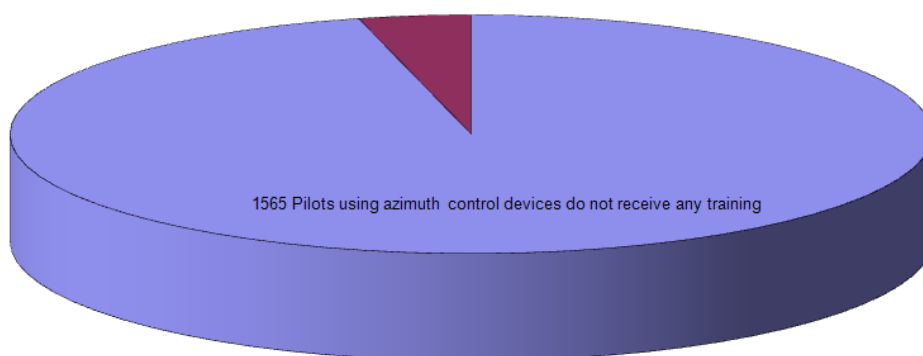
**Figure 4**

As it can be seen from the above figure, only 35% of the trained pilot received their training at dedicated training establishments.

The result of this survey is the knowledge that the 68% of the respondent pilots do not receive any training on the systems they use. Another way to instruct pilots about the use of azipods is the provision, by pilotage organizations, of documentations and guidance about the use of these systems. Only 64 pilots answered they have received this kind of support to learn the functioning of azipods.

**Guidance Issued**

64 are issued with guidance by the organisation responsible for the provision of pilotage services



**Figure 5**

**1.1 Final conclusions from the survey**

The data collected during the survey conducted among the pilots worldwide clearly reveals that in comparison to the great use of azipods and pod systems, there is an inadequate support for

what regards the training phase. A small portion of pilots receive an appropriate training and it is mostly provided through in-house courses.

The documentation and guidance provided to pilot from the pilotage organizations for what regard the way azipods have to be correctly used.

As a conclusion, the survey certainly reveals the need to increase the sensitivity of the pilotage organizations (and also of the shipping companies with ships equipped with these propulsion systems) about the provision of training courses to their pilots (officers) in order to use azipods in the most effective way in all different kind of situations they could have to afford and to be sufficiently trained to avoid errors and incidents.

## 2 INTERVIEWS

In this chapter will be presented the results coming from some interviews conducted by UKMPA officers of ships equipped with azipods, namely with the following :

- Master of Independence of the Seas
- Master of Norwegian Jade
- Master of Queen Victoria

The answers of these masters have been collected and analyzed and the most interesting issues will be presented in the following paragraphs. The interviews will be considered one by one focusing on the most interesting matters for the achievements of the AZIPILOT's objectives.

### 2.1 First interview

The first interview reported here mainly treats of training issues. A second part of the interview is about operational indications and experience of the Master.

#### Training

The Master declared to have attended a training course at FORCE Technology in Lyngby where he had done the Bridge Team Management Course followed up by 1½ days of pure azipod training on the simulator. His thought is that one of the main scopes of a training course is to give some theory about how the pod works because it is something completely different for traditional propulsion devices. *"The thing we had to understand first and foremost was that the pod was pulling you through the water and not pushing you through the water"*. The training received onboard often has to face the restriction of the Shipping Company about the way of operating the motors, especially in the attempt to save bearings. For this matter, some manouevres (e.g. reverse the motors in the pod) are not allowed if not due to emergency situations.

The Master's experience with the training course was good, also because they had the copy of the particular retrictions of the Company and so the training was more realistic and considered all possible real situations the officers on board could face. The only problem was due to the short duration of the course (only 1½ day available): *"it is not a lot of time in a simulator to get your head around a completely new way of handling a ship... what we wanted to learn to do was to get the ship in and out of Ports, to put the ship alongside and lift off and to turn in tight areas"*.

The Master underlined his preference about a longer course, e.g. 5 days, which *"have made it a little more relaxed and less intense and give time to plan exercises to discuss and to talk and to go over things you have done wrong and give you time to correct them before moving onto the next exercise"*.

The Master's point of view is that officers have to do the training before their arrive onboard and not viceversa: *"it is such a different way of drining a ship from the conventional ship. If you had no training whatsoever you could be overwhelmed by what you find"*.

When commenting the difficulties found by seafarers to sit in classrooms for hours listening to the teacher, the possibility of a balance between theory and practice and remembering his experience, he said that *"the instructor was very aware he had a very short time period to teach*



*us so the theory was less than one hour. I think there is more room to talk about how the pod works, what it can do and what it cannot do and to discuss how to approach things and why you approach it in that manner, he did a very good job in the time available”.*

When asked about the objectives of its training course, the Master answered that *” There was no examination, no pass or fail. What should have been achieved was me being competent to come here. Now I understand the pods, I understand the theory from being in the simulator and having a few days hand over. This was not achieved by the Course alone, it was too short, so when you do come here after a short course you have a reasonable idea of what is going on but there is still a lot to learn during the handover”.*

Actually there is the M notice which gives guidance for the use of azipods but the problem is that it's not mandatory. *“If you consider the risks of what could go wrong, pollution, damage to the port infrastructure or the ship itself and any liability that would attach then commonsense would suggest training is necessary but sadly our industry only does things when it is mandatory”.* The Master also thinks that, in particular within the cruise industry, is important that knowledge should be passed between Companies: *“at the moment there is no way of sharing experience, which is wrong really with so many ships going to the same places with the same problems with turning circles, docks, Pilots, etc.”*

In conclusion, the Master does not think that the age and personal ability represents a barrier or an obstacle for the right use of the azipods: *“the way our industry has changed you have to adapt to new technology, if you do not you become a dinosaur very quickly”.*

### **Operations**

The interviewed Master does not think that the use of azipods is intuitive, because there is to think a lot about the right way to operate also due to the particular restrictions of the Company. In the particular case in exam, the Master has to face with a restriction of the Company that is aimed at avoiding damages and failures to the bearings, for which there is an engineering problem. This problem prevents the Master to operate the azipods at more than 25rpm and to reverse the pods in order to safeguard the bearing ring and not force it with shocks.

The Master also describes the use of azipods as *“a complete change of life style”* and then *“azipods are not easy and it's a completely different mind set. It gives you more control but if you do not understand them properly, your expectations of what you can do run away with you. The technology is amazing but the amount of power you have available is limited and there are definite limitations in what you can safely do and it's difficult to get personnel in Company offices to understand those limitations”.*

One of the main problems with the use of azipods is the lack of synchronization between the centre and the wing console when moving out to the bridge wing. The Master describes that *“On here the control handles are not synchronised so when you move from one control position to another you have to be very careful on what is set before pressing the take over button. It has to be the same because whatever you have set will be what the pods will go to very quickly”.*

The occurrence of mistakes and errors also give the possibility to improve the operational protocol and, for the case of the ship where the interviewed Master is working on, the protocol is that *“the Master is in the middle with the Pilot with the navigator. When they are ready to move to the bridge wing the Staff Captain will move over to the wing console. They will say ‘synchronise’ and he will move the controls of the pods and the bow thruster, if necessary, to the same alignment as that at the centre of the ship. When the staff Captain is ready he will say he is ready to take control and the Master says ‘Take Control’ on the bridge wing. The Staff Captain will press the button and give a positive report that he has control and the other actors move over to the bridge wing. They of course have to choose an appropriate time when to do that so they do not do that at a critical part of the manoeuvre. There are two lessons learnt there, how to change control and when to change control”.*

According to the Master, human factors have to play in many ways in operating pods because there are a lot of procedures to follow due to the complicated technology. The procedures have to be followed in a right manner because the pod failure can be catastrophic.

The Master was also asked about how the Bridge Team operate and he reported that *“in the middle the navigator sits in the starboard chair and the co-navigator sits in the port chair. The Pilot sits over here and has this radar unit, while I stand in the middle where I can oversee what everyone is doing. When approaching the berth we come out of ‘manoeuvring direct’ mode, which takes steering away from the helmsman and then we can start reducing speed. At about 500m before we start swinging; the pods will be set to normally inboard 90° with 30 rpm on each, we switch to ‘Aziman’, the bow thrusters are already on line so we can now steer the ship by a combination of pods and bow thrusters. We can use the pods with 30 rpm and changing their direction to slow the ship down and stop her in the swinging circle. Once we are ready to start turning we put the pods to inboard 90°. Its now time to change to the bridge wing and we go through the protocol described earlier. With the pods inboard 90° and in a neutral position it is a safe time to change control position”*.

For what concerns the documentation on board providing guidance for the right use of the systems, the Master said that this documentation tends to be telling crew what not to do rather than what to do. Officers usually have their own notes for the use of the Bridge Team where they write what they do in each port.

In conclusion, he was asked about the reliability of the change over procedure. He replied as follow: *“It’s two buttons and there is an audible alarm and a visual change in the colour of the buttons to confirm the change over has taken place. The Staff Captain is already here and confirms to me the position of the pods and bow thruster, and then stands aside. I will always operate the pod controls, I never let the Pilot operate them. The amount of information right in front of you includes the visual displays with the Doppler showing the bow and stern movements and the position and revolutions on each pod”*.

## 2.2 Second interview

The second interview was most focused on the issue of operation onboard ship. Also some questions concerning training and procedures has been asked.

### Training

The interviewed Master had attended a training course of 14 days where received DP Training, other courses (such as Bridge Team Training) and only 3-4 days concerning pods. When asked about the most important point to learn during the training course, he replied as follows: *“there are so many things hanging together and unfortunately the new breed of Officer learns from a computer and that what the computer tells them is correct. Seamanship does not appear so important, if you do not have seamanship and do not understand how regular ships behave, then I can see that they will have problems, that is the biggest challenge and it is hard to explain how the pods work”*. The impression of the master is that, apart from the training received, most depends about the personal attitudes of the single person. In fact he said: *“I have seen a lot of good seamen who can operate normal ships but have difficulty with the pods. I have been with them and tried to teach them but they cannot grasp it... some people have no problem but others, no matter how much training you provide, they just cannot do it”*.

The discussion also touched the issue of mandatory training for anyone working on a podded ship. The master said that the attendance of a training course is a Company recommendation in his case and generally the procedure is that the Company sends a 2nd officer on the Course. It is a Ship Management responsibility to organize things so that 2nd officers could attend the Courses.

For what regards sea trials, Master was asked if data collected in the course of them (and afterwards reported on the Manoeuvring Poster and in the wheelhouse) are coming from real data or if they are taken from a computer programme. The Master replied that he was present during the sea trials of the ship and, after the shipyard gave it to them, they did all the operations they consider to be necessary. Data coming from those trials were collected and reported in the proper documentation on board. For what regards the use of the Manoeuvring booklet on board

ship, the Master declared that he doesn't trust in them too much as the reality of thing is quite different from how appear on those Manuals.

They have on board an Operations or Procedure Manual nad they train the Bridge Team on a weekly basis onboard.

### Operations

The Master made the experience of the passage from a fixed podded ship to a ship equipped with azimuthing pods. His feeling is that the latters increase the manouvability in comparison to his older experience.

The Master said that, in spite of the full rating of the pod, only a small amount of power is really used during the manouvres.

The particular ship where the Master is working on have a skeg and so, when the propeller is put towards the skeg they reduce the efficiency of the pod down to 65% because they are not able to draw enough water into the propeller.

The Master said that, in case of berthing, they behave in the same way of a normal ship. *"it's still a ship, so I approach the berth if it was a conventinal ship, why go sideways, you are using a lot of power and energy which costs money. When you are approaching the berth I usually look to have the outboard pod at about 48° ready to counter the bow should it start to swing out – this gives the best effect – and the inboard pod at 90° ready to stop the stern swinging into the berth but of course you can put the pods at any direction you want"*. The ship have to be manouvered as a conventional ship also because there could be the risk that having so much power ther could be the tendency to forget about the basic ship handling principles.

On the ship the Master is working in, there are not indicators of the efficiency of the pods niether visual nor audible alarms.

The Master gave some indications about the way of operating the ship while he's handling the ship, in particular for what regards the communications with the others in the Bridge Team. The Master said that *"when manoeuvring, everyone has their role to play and the man in the cockpit is monitoring what is happening and operating the instruments and has an overview, so if something happens he has to deal with it because it is only from that station that you can, for example, start another bow thrusters. Standing on the bridge wing, we rely on him and he has to revert back to us and close the loop. So, we have one back up officer and he starts completing the check list a long time before the Pilot comes onboard"*.

The Master reveals that sometimes the Staff Captain is also involved in the manoeuvring, in particular when there is time available because they need to try and, naturally, they make mistakes and not always this is possible to do. The Pilot contributes to a bridge Team on a podded ship by *"giving advice and using his local knowledge, during the manoeuvring it is difficult to tell him what I am doing or to explain what I am doing"*.

The Master said that he has never been in an emergency situation where he lost control of one of the pods but *"of course we have two pumps on each pod. You would need to reduce speed and come out of track because in track mode the autopilot will try and bring you back on track and at 20 knots you do not want to have rates of turn in excess of 3° a minute or else you will have stability problems"*.

### **2.3 Third interview**

The main items treated during this interview are the aspects concerning training, operations and controls of the system.

### Training

The Master declared that the use of azipods is a completely different way of tinking to the rudder and propeller shaft and so an appropriate training would be useful for potential users. The training would be fit to give appropriate means at officers who *"need to learn the limitation and understand the system, it is two completely independant units and if something goes wrong*

*what is important is to know what to do if the steering start to go wrong, they need to know what to do. They are powerful units and if they go out of control bad things can happen it is not like a rudder which goes only to certain angle".* The Master also underlined that from his point of view, the operation with azipods does not require a certain personality: *"you need to understand but that is the same with any shiphandling"*.

He also said that *"a good qualified Captain who has proved knowledge of regular shiphandling he can quite easitly adapt to azipods it is not that complicated but I think a lot of my knowledge has been gained with 6 years on this class of ship I have seen what can go wrong with the steering, I have seen through the sea trials the limitations I think a lot of my knowledge which I take for granted has come from watching other Captains"*.

When asked about the optimal duration of the training course for an officer about the azipods, he replied that *"at least one day to understand the basic mechanics of teh system, how the steering works and if one failed for example. Then one full day to talk about the azipods and how to operate them to optimal effect then perhaps a third day to have some practice so three days should be good"*.

The use of the azipod at the beginning could give some problems as the Master also reported: *"when I first learned about the azipods the thing that was most surprising was that it was pulling pod rather than pushing so we had to change the mind set to actually turn to starboard the propeller goes to port but ince you got over that is ok"*.

When asker about his opinion about the possible existence of a relation between age and ability and so if younger people would adapt quicker than older people, the Master said: *"I have seen older Captains who are really good at it but one of the biggest problems is that these are big ships but highly manouvvable and people et overconfident. These ships are very forgiving if you come to fast you can stop them quikly so you need to be a little bit careful not to get out of the comfort zone"*.

### **Operations**

The Master gave a lot of answers about his experience with pods and among all these things there are reported some matters of main interest.

He said that, while operating with pods, he doesn't need to look at any screen as the use of the controls is so instinctive that he can always understand how he's moving. From his point of view, the most difficult thing he learnt about manoeuvring with pods is reported as follows: *"from the beginning we used the T bone which is like using the pod as a stern thruster, I did this for maybe a year then we started to play with angles, theonly reason we started to play with angles was because of the problems with thrust bearings and the need to use only positive rpm so that was the beginning and since then many people are using the pods more. Some people use them in the opposite direction, that is outboard, using the pod outboard has risks, putting water onto the other pod or on to the skeg, having them inboard you will always have clean water flow and positive rpm"*.

In another part of the interview, he illustrated his personal strategy on using vectors while approaching a berth. *"When we are doing an approach to the berth we transfer control to the bridge wing we have less than a mile, maybe ½ mile to go apporaching the berth, the bridge wing is set up and the first thing I normally do is take control of the bow thruster then the azipods then I will turn them inwards, like a transverse arrest, this is ready to take the speed off, as the speed comes off if she starts to turn into the wind or is affected by current I do not have to turn the pods around ready to lift the stern. On the final approach I adjust the angles slightly to control the speed if necessary. The pods turn quickly, we have four different speeds, during manoeuvring we always have two pumps on each pod at all times and the pod turns quite quickly, if it becomes critical then we can go fast or that will increase the oil pressure and double the speed the pod turns"*.

Human factors have a big part in the area of manoeuvring with azipods because *"there are a lot of things that can go wrong with azipods particularly in emergency situations and if you start playing around with azimuths, with angles, etc., they are very powerful and things can get very bad, for example if you lose the steering and do not know what to do"*.

For what regards the use of instruments the Master gave the overview of the scenario present on his ship. *“here we have the conning speed in the docking mode, we have different views depending on which bridge wing we are on with the bow facing forward. You have the vectors showing the bow and the stern movement, for manoeuvring we can have different vector lengths, I prefer 90 secs, this becomes more useful as you approach the berth as it gives you an idea of the trend and you can make sure you are going in the right direction and of course you have the additional radar vector”*.

Then, he also spoke about the problems of the dimensions of ports and ships. *“the Ports are the same but the ships are getting bigger with more power so ship handling today is different. Ships were underpowered and you would have used the wind and current and you had more space because the ships were smaller but today the Ports are very small it is more about precision and position”*.

### **Manuals**

The Master revealed that he has attended the sea trials for the ship where he could see some particular manoeuvres (as crash stop, different ways to do it, etc.) and everything he saw there was registered and indications about that are contained on the Bridge Poster, that he personally do not use often.

The Manuals on board contains all relevant information about the use of the system in different contexts but the Master said that officer has to know them by heart to be ready and to react promptly when needed.

## **3 SURVEY AT PORT REVEL**

In the last section of this report, the results of the pilot survey conducted through the attendants of a training course at Port Revel facilities will be briefly described.

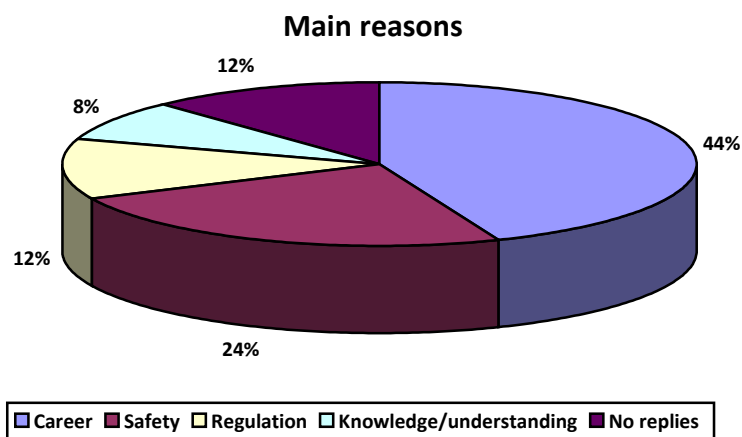
The survey, and the related questionnaire delivered to the attendants (bridge crew), was focused on the issues of “Usability and intuitive control of azipod/-pull propulsion control systems”. The text of the questionnaire will be included in the appendix of this report.

The questionnaire was completed by 25 people (mainly pilots) and the average age of the sample was of 49 years. Only 8 (32%) of them declared that they have already received in the past some kind of training about the use of azipods.

When asked about the main reason for having attended the training course, they answered as follows:

<b>Main reason for attending azipod courses</b>	
<b>Career</b>	11
<b>Safety</b>	6
<b>Regulation</b>	3
<b>Knowledge/understanding</b>	2
<b>No replies</b>	3





A large majority (19 answers) considers the azipod system intuitive and easy of use. When asked about the importance to have an azipod system (controllers, type and model) for training that is exactly the same as the one present on the ship they will work on, the replies vary very much: we can say that the average result of this question is that it is quite important to have the same system on board but not strictly necessary.

Following there are listed the ideal aims that a training course should have, according to the people surveyed:

- Practical use of the system;
- Hands on use;
- Understand the ship's reactions;
- Principles of use of the system;
- Learn about the emergency procedures;
- Limitations of use;
- Safety matters.

A summary table is reported below with all the answers collected in the interview. The ratings contained in the table varies from 1 (worst) to 7 (best).

Age	Years in post	Previous training	Sim/MM	Previous experience	Reason for training	Ideal no. on course	Bridge layout	Ease of use	Feel of controls	Importance of similarity of controls	Ideal aim of the course	Expectation met by course	Satisfaction with course
45	9	Yes	Sim	None	Career	8	6	Yes	6	4	Hands on use	4	5
59	22	Yes	Sim	None	Safety	8	4	Yes		7	Practical use	6	7
58	17	No		Yes	Career		3		6	6	Learning to use	5	
46	11	No		Yes			5	Yes				4	6
50	16	No		None									5
59	20	No		Yes	Regulation	2	3	No	4	3	Ship reaction	5	3
49	7	No		None	Career			No		7	Hands on use	6	6
48	11	No		Yes	Safety	4			6	3		6	5
57	10	Yes	Sim	Yes	Safety	8	5	Yes				4	5
51	10	No		None	Career			Yes		7	Practical use	7	7
45	7	No		Yes	Regulation	2	5	Yes	7	6	Principles of use	6	6
57	18	No		Yes	Understanding			Yes		6	Confidence to use	7	6
42	12	No		Yes	Career	8	6	Yes	7	1	Learning to use	1	5
48	15	No		None	Career			Yes		7	Practical use	7	7
53	20	No		Yes	Regulation	2	3	Yes	5	2	Emergency procedures	7	6
46	15	Yes	Sim	None	Career		7	Yes	7	2	Confidence to use	7	7
43	10	No		Yes				Yes	5	2	Hands on use		7
47	10	Yes	Sim	None	Career			No	7	4	Emergency procedures	7	
39	3	Yes	Sim	Yes	Safety	4	5	Yes	5	5	Principles of use	4	7
38	5	No		None	Career			Yes		7	Practical use	7	7
56	15	No		Yes	Safety	8	6	Yes	4	4	Limitations of use	4	4
39		No		None	Safety			Yes		4	Safety	7	7
37	3	No		Yes	Career	8	7	Yes	7	1	Limitations of use	6	1
59	22	Yes	Sim	Yes	Knowledge			Yes		3	Limitations of use	7	7
53	17	Yes	Sim	Yes	Career			Yes		1	Confidence to use	7	7

**APPENDIX 1 – Questionnaire at Port Revel****Questionnaire about:*****Usability and intuitive control of azipod/-pull propulsion control systems:***

- to be filled in by bridge crew

## Introduction:

The rapid increase in the number of vessels being fitted with azimuth control devices has risen sharply in recent years and has rapidly established itself in the maritime industry. Azimuth control devices provide an innovative solution for ship propulsion and steering that offers significant economical and operational advantages when manoeuvring in close quarter situations within the confines of harbours and ports. However with these devices manoeuvring control can become complicated and counterintuitive. It is the assumption that the rapid evolution and introduction of azipod/-pull propulsion systems has not allowed sufficient time for the establishment of a proper training regime amongst bridge officers who are faced with the infinite number of control options that azimuth devices offer.

The School of Marine Science and Technology at Newcastle University in the UK has put together a project, part funded by the European Commission, aimed at bringing together Naval Architects, Ship Owners, Simulator Manufacturers, Maritime Training Establishments and Marine Pilots. The project, entitled AZIPILOT, commenced in November 2008 and will run for three years during which time it will amass sufficient material appropriate for the formulation of a dedicated maritime training programme, make recommendations for specific regulations and criteria specifically related to the use of azimuthing control devices, amass sufficient material appropriate for the formulation of a dedicated University level lecture series and finally to publish an ongoing dedicated technical journal to disseminate the findings of the project.

Port Revel, Ilawa Ship Handling Centre and South Tyneside College are partners in this EU project and one of the tasks is to review existing operational practice in the training, bridge officers and Pilots undergo in the use of azipod/-pull propulsion systems.

Any contribution is welcome. You are welcome to answer the questionnaire anonymously. But please note company name and job title. The information from your particular answers will not be supplied to your company and will be used in a generalised and anonymous form only. Thank you very much for your contribution☺.

Please turn page to start answering the questions

→



Name of present course: **Port Revel's Pod & Emergency shiphandling Course**

Duration of present course (days): **5 days**

Content of present course:

- Exercises with pods: docking, undocking in current, crabbing with pods and bow thruster, pod failures and emergency stopping in various modes.
- Emergency shiphandling: emergency stopping in a canal with anchors, docking and undocking with dredging anchor, zigzag manoeuvre with escort tug at stern and engine/rudder failures, proceeding through channels with engine/rudder failures, using the escort tug to stay in the channel.

Date of completion of present course: **30/10/2009**

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(Please answer the following questions the best you can. If you are asked to scale your answers please mark the correct number/statement with a circle.)

## Questions:

The name of your company:

Your position:

Your age:

Years of experience in present position:

Your primary tasks:

---

Have you attended azipod/-pull courses before?

-if so, please note which, where, duration, and describe their contents briefly:

Type and name of vessels you are operating, supposed to operate on or training for in this course: **number of pods, tech details**

How much “hands-on” experience have you had with operation of azipod/-pull propulsion controllers and systems in your maritime career (check  $\surd$  best fit)?

- 1 month
- 2 months
- 6 months
- More than 6 months

If you have prior experience please note with which azipod/-pull systems and with which controller devices (Rolls Royce, ABB etc.):

Does your company provide any operational guidance (manuals/procedures) on the use of azipods?

- yes
- no

If yes how useful have you found this guidance to be when operating azipod units?

Low High

1    2    3    4    5    6    7

What is your personal motivation for attending azipod/-pull courses (career, regulations, insurance, safety, economy, other)?

What do you think is your company’s motivation for sending you on azipod/-pull courses (regulations, insurance, safety, economy, other)?

What is your general satisfaction with the actual course regarding intuitive use of azipod/-pull controls?

Low High

1    2    3    4    5    6    7

Does the course experience correspond to your expectations of learning to intuitively use azipod/-pull controls?

Very little Highly

1    2    3    4    5    6    7

Are the controllers for the pods easy and intuitive to use

- yes
- no

If yes, why?

If not, why ?

Is there anything you would like azipod pull/push courses to offer that you do not think is already available (or not sufficiently covered)?

What do you think is most important for you to learn while attending courses in azipod pull/push operation?

How important is it that the *make, type and model of the azipod pull/push controllers used on the Course is exactly the same* as it is on the ship you are being trained to handle?

Not important at all								Very important
	1	2	3	4	5	6	7	

How important is it that the feedback **instruments** (ex. angle of thrust and revolution indicators) used on the Course *are exactly the same and shows exactly the same* as they do on the vessel you are being trained to handle?

Not important at all								Very important
	1	2	3	4	5	6	7	

Does your vessel(s) have any kind of automation for the steering or propulsion controls of the azipod pull/push

If so – which?

What is your opinion of the safety and usability of these automation systems (answer only if you have experience with such system)?

**Safety:**

Safe								Unsafe
	1	2	3	4	5	6	7	

**Usability:**

Highly usable								Useless
	1	2	3	4	5	6	7	

please explain further in a few words:

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Can you think of an automation feature (ex. coupling of pods, regulation of relative angle between pods) that could be beneficial to your specific vessels/operating conditions/situations?

If so – which?

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Will you be happy to be contacted by the Azipilot EU-project to ask you for more information if needed?

If so, what are your contact details?

Mail:

Phone:

**All replies will be treated in confidence. It would be helpful if the person completing this form provide his/her contact details so we may contact him/her directly for further information if required.**

Thank you very much for your participation.

You can follow the project on the web: <http://pilot.ncl.ac.uk>