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DIGITALIZATION IN SHIPPING -
TRENDS TOWARDS 2025

OCEANKING SA

“Technology ambassadors
in a challenging shipping environment”

Oceanking technology ambassadors in a challenging shipping environment

P. Doukas: What is the competitive advantage of the companies that OCEANKING represents in order to meet the specific needs and expectations of Greek shipowners?

C. Hassiotis: OCEANKING strategy has always been the selection and representation of market leading companies, both globally and locally.

Our selection criteria for these companies are indeed their unique competitive advantages, which can be summarized as follows: to be market leaders with high market share globally and technologically advanced products and novel ideas. It is also very important to cooperate with companies that understand the particular characteristics of our market and are willing to adapt accordingly in order to grow in Greece.

The companies we represent, with our assistance; reach a very good knowledge of the Greek shipowners' mentality and needs. Being market leaders, they invest on R&D and are developing continuously new products, fully complying to the present and future regulations and needs of the shipowners.

Another competitive advantage is their focus on after sales support when it comes to fast response for spare parts and service, providing technical solutions to problems through a competent global after sales support network. Their good understanding of the Greek shipping market and mentality have made them flexible and adaptable and have created relationships with our customers, which enable them to be considered as their preferred partners for their new buildings and existing fleet.

We are covering a wide range of ship equipment and systems for ship engine room, propulsion, maneuvering, hull machinery, cargo handling, safety and accommodation.

As I said, our vision is to represent companies that are leaders in their field, offering cutting edge technologies and many references, reliable operations and worldwide customer support services network, thus creating satisfied customers who, most of the times, confirm their confidence in OCEANKING proposals through repeat orders.

P. Doukas: What should be the role of a representative office in shipping and what is OCEANKING's key of success in the Greek demanding market?

C. Hassiotis: The role of a representative office is exactly what stated in my previous answer, i.e. to succeed in being considered by our customers as their partners.

Specifically, the role of a successful representative office is to "bridge the gap" between the supplier and the end user, by adding value to the whole supply chain. Practically, this means that the representative must provide early and reliable information, both on technical and commercial issues, meeting the needs and expectations of the customers.

We consider ourselves as "technology ambassadors" for our customers, while we transfer back, in an objective and clear way to our Principals, the real needs and experience of our customers. For a representative office to be useful in today's digital world, for sure

we must add value to what we do. OCEANKING is very focused on providing fast and reliable after sales service, which we believe is the key to our success. We try to be always present and available to solve problems on a 24/7 basis supported by our Principals. Knowing the market and speaking the language, representatives must guide correctly and inform promptly their partners about the trends in the market, the new contracts and the business opportunities. A modern representative office like OCEANKING should offer an integrated range of technical and commercial services...

OCEANKING success during our nearly 30 years existence is reflected and driven by our values, namely: priority and trust to our customers' requirements, commitment to high added value quality services, loyalty, teamwork and of course, as I said above, the fact that we represent an array of globally leading companies covering equipment and services for the entire ship.

OCEANKING is not just a "post office", but rather a modern, integrated and dynamic company, staffed by true professionals and qualified engineers, all having a passion in what we do.

These values have enabled us to succeed in our mission, which is nothing less than to create satisfied customers, who consider OCEANKING and our Principals as long term partners and their preferred suppliers.

P. Doukas: The world of shipping is undergoing transformations. Do you believe that in this setting, representative offices have an ever more important role to play?

C. Hassiotis: Yes indeed! At the beginning of this interview, we made reference to the changing shipping industry, as a result of new regulations originating from economy, market, energy and environment parameters.

As mentioned above, we consider companies like OCEANKING to be technology ambassadors, among other things. Representative offices are an integral part of the shipping market stakeholders and play an important role in the supply chain. That means that, as the market changes, representative offices must adapt accordingly, not only to follow the change, but to be part of it and contribute to it. Our role is dynamic and not static. Through the new technologies created by our Principals, we also help our customers to change. Change is progress and in shipping progress is translated to more cost efficient, environmentally friendly, profitable and safe operations. This transformation is taking place not only technologically (new products to comply with new regulations etc.), but also through processes. In order to be successful (and useful) a representative office, as part of the shipping ecosystem, has an even larger role to play. We at OCEANKING, in order to continue providing meaningful services for the Greek maritime community and industry, have to monitor these new parameters and the emerging technologies under development to satisfy new regulations and operational requirements, thus being in a position to propose and offer carefully evaluated and selected technical solutions to our customers. This is the role we try to play in the most effective way and results seem to be gratifying!

We believe OCEANKING has succeeded in that, something which



From left: Panos Yannoulis, President, Costas Hassiotis, CEO, Carola Yannouli, General Manager

OCEANKING's mission is to provide the Greek Maritime community with technical and commercial services of high added value, quality and reliability, in co-operation with its Principals, who are market leaders in their field, thus creating satisfied customers, who will consider **OCEANKING** and its Principals as long term partners and their preferred suppliers. The company promotes what they call the “**golden triangle**” of communication, between its Principals, its customers and themselves, on real time and fast. Such communication lines are built on trust, after many years of experience, with honesty, driven by **OCEANKING's** values.

is appreciated by our customers, however we are always trying to improve.

P. Doukas: How important is for OCEANKING to build solid communication lines with its customers service in presenting them in cutting edge technologies. In what ways do you implement this important goal?

C. Hassiotis: Thank you for asking this, which comes as follow-on to the previous questions.

As I mentioned earlier, solid communication lines with customers have been always the strong point of OCEANKING.

We have a strong team of sales managers, all having a solid technical and commercial education, in addition to their expertise in ship design, ship construction, ship outfitting and ship operations. Therefore, they are capable to get very deep in the technologies they promote and, in parallel, to undertake teamwork for multi-equipment projects of whatever complexity.

Recognized for many years as technical experts in their fields, communication lines with decision makers in shipping companies

are most of the times very solid.

In addition to personal relations, we maintain regular communication through mail shots on important technical issues, regular visits with or without representatives from our Principals, technical seminars and presentations of products we represent, training courses (theoretical and hands-on), claims handling, after sales customers support and, last but not least, by participating at POSIDONIA, where we have always a large and effective stand, exhibiting our Principals' latest equipment and technologies.

In conclusion, we promote what we call the “golden triangle” of communication, between our Principals, our customers and ourselves, on real time and fast. Such communication lines are built on trust, after many years of experience, with honesty, driven by our values, as I explained above.

P. Doukas: As far as the Sulphur cap consequences and challenges expected to come in place in 2020, which is the best solution regarding new vessels and existing ones?

P. Yannoulis: There are three (3) main alternatives to meet



From left: Panos Yannoulis, President, Costas Hassiotis, CEO, Carola Yannouli, General Manager

MARPOL-Annex VI and EU Sulphur Directive as far as Sulphur content in ship exhaust gasses is concerned, including global cap on 1st January 2020, namely:

- a. Use low Sulphur fuel**
- b. Use HFO and install an EGCS (scrubber)**
- c. Use LNG as fuel**

The first alternative, although it looks like being the most straight forward and it is for sure the one that requires the lowest initial investment (CAPEX), nevertheless it presents many and serious challenges. The technical challenges involve storage, stability and compatibility issues, as well as lubricity and viscosity issues leading to high risk in M.E. operation, increased wear and tear in the M.E. etc. In addition, LSFO requires delicate change-over procedures from HFO to LSFO to avoid thermal shock.

However, the most serious challenge today is the commercial uncertainty on the availability and price of LSFO on 01/01/2020, making this option suboptimum to my opinion..

The alternative of using LNG as marine fuel on existing ships requires extensive modification of engines in addition to considerable additional space for LNG fuel tank(s). This alternative, although solving the emissions problem, presents the highest CAPEX among alternatives, loss of cargo carrying capacity (space for fuel tanks) and considerable OPEX for arranging a properly trained skilled crew. Last but not least, there is still today lack of LNG bunkering facilities, except in handful key ports worldwide. Therefore, LNG fuel is not a cost effective alternative for existing vessels. For new buildings it is a valid alternative, especially for vessels operating in predefined routes i.e. ferries, cruise vessels, container ships/

liners etc. and it will be more so when LNG bunkering infrastructure develops in the future.

Finally, EGCS (scrubbers) currently represents the best solution, being the most cost effective, low risk alternative for existing vessels and, to a great extent, for new buildings operating in other than liner routes and spot market, i.e. bulk carriers, tankers, etc. In fact, it is the most operation friendly solution, based on existing mature technology and the ROI can be very fast considering that the corresponding vessels can continue to burn conventional HFO, operate with standard crews and bunker following established paths worldwide. In particular, conventional cargo vessels like tankers can be fitted with the most simple and easy to operate "open loop" type, as they seldom enter into ports and protected waters. In fact, they usually call on terminals. Even in case they have to avoid any discharge for a limited time, they can either run their scrubbers in dry condition, or switch over to LSFO for the required limited time and run their generator(s) with diesel fuel when maneuvering. Otherwise, a "hybrid" or "closed loop" system should be provided. We strongly believe that shipowners should start preparing now for adopting a solution instead of waiting for 2020. Why? Because retrofitting a vessel with a scrubber requires detailed engineering and demand will peak for 2019 (as mentioned for BWTS herebelow).

P. Doukas: Do you believe that the international organizations and regulators should recognize the need for more time until the implementation of the BWM convention?

P. Yannoulis: The BMW Convention, although it was adopted by

IMO in 2003, it was ratified by the necessary number of countries only last year and will enter into force in September 2017. This time frame should have given enough time to the corresponding manufacturers to develop their proposed technologies and supply mature systems when orders were placed by early movers, starting by 2010 approx. However, the complexity of the process of ballast water treatment, the lack of clarity in IMO rules and the complications introduced by the USCG implementation and verification (testing) requirements, which were later introduced and enforced (irrespective of the parallel ratification process of the IMO Rules & Guidelines), have penalized the early movers by forcing them to undertake excessive risks and expenses to make the installed systems operational, sharing of course the risks and expenses with the corresponding manufacturers of the systems. This created the need and requirement by early movers to ask for a kind of a "grand fathering" clause in the Convention to allow them a more "generous" and "flexible" approach by port authorities when surveying these vessels after the enforcement of the Convention itself. This will be most probably the case, although it cannot be officially stated in a revision to the Convention. On the other hand, we foresee a bottleneck for the ship repairing industry to absorb all retrofitting demand for BWTS to be installed onboard existing vessels in the timeframe between the entrance into force of the Convention and the first scheduled special survey dry-docking, even considering that a number of vessels will have to be scrapped, because the cost of procuring and installing a BWTS, in addition to other regulation driven equipment, may result in exceeding the commercial value of the ship herself! The revision of IMO G8 Guidelines, as far as testing and verification is concerned, to get the revised type approval, make things even more complicated.

Therefore, more than the need to allow additional time for the implementation of the BWM Convention, measures should be taken by flag authorities, including USCG, to smooth out this bottleneck by, for example, allowing a vessel to have a BWTS installed later, within certain limits, if a shipowning company produces evidence that a type approved BWTS is already ordered.

P. Doukas: How the current regulatory environment with new and significant requirements coming into effect, like BWM, MRV, Sulphur cap, TMSA 3, etc. will affect shipping industry in the near future? Is it possible the "Trump" parameter to affect the enforcement of environmental regulations?

P. Yannoulis: As already stated above, the practically simultaneous implementation of various regulations leading to the procurement of high value equipment can result often to capital expenses (CAPEX) for shipping companies equaling the value of the corresponding vessels. Overall, the "bombardment" of new requirements and regulations will affect shipping in many ways, not always negative though.

On one hand, I see the heavy bureaucracy imposed on the companies with new procedures for compliance. Non or part compliance may lead into a "two -tier" market. Lack of financing or shortage of available funds may strangle some small companies in the present adverse market.

On the other hand, companies need to comply and the high CAPEX may encourage owners to scrap even moderate age existing tonnage in next 5-8 years and look for newbuildings, as a preferable way to satisfy all requirements for the years to come.

This is not necessarily bad, as it will improve the supply and demand balance. This, in combination with the "Trump parameter"

about OCEANKING

OCEANKING is a leading technical and commercial marine company established in 1989 in Piraeus, comprising qualified and experienced Marine Engineers, Naval Architects and Electronic Engineers, with shipbuilding, shiprepairing, sales and ship operations experience.

OCEANKING is certified by LRQA in accordance with ISO 9001 since 2006 and is considered to be the leading company in Piraeus, when it comes to representation, promotion, sales and support for marine equipment and systems.

Our mission is to provide the Greek Maritime community with technical and commercial services of high added value, quality and reliability, in co-operation with our Principals, who are market leaders in their field, thus creating satisfied customers, who will consider **OCEANKING** and its Principals as long term partners and their preferred suppliers.

OCEANKING's main activities can be summarized as follows:

- Equipment representatives and suppliers of Marine Equipment for:
- Engine Room / Propulsion.
- Deck / Hull.
- Electrical / Electronic.
- Accommodation.
- Cryogenic Technologies for LNG, for both onshore and offshore applications
- Supply of Eco Technologies & Systems in compliance with the latest marine environmental regulations
- Integrated after sales support services, for the provision of spare parts, servicing, repairs, and training.
- Equipment retrofits (EPC) for BWT, Scrubbers and LNG as fuel systems
- Repair services for marine equipment.
- Specialized equipment and systems for Navy, Defence and on-shore applications.
- Purchasing consultancy for ship equipment.

(more infrastructure contracts, therefore more raw materials to be transported, mainly by sea), could eventually improve shipping in the near future. However, this very much depends on many other parameters, like mix of energy resources for power production and transport activities (oil, gas, new fuels, renewable energy sources, etc.), in combination with the rate of development of the world economy.

Of course, from the technological industry's point of view (makers, shipyards etc.), the new regulatory requirements is a positive driver for developing new technologies, thus enhancing the technological and environmental profile of the shipping sector.

The truth is that the shipping sector is overregulated compared to other sectors, but this offers opportunities to the stakeholders, depending on their view point.

P. Doukas: By working together with some of the industry's technology leaders could you please describe their abilities towards a competitive, compliant and safe vessel operation?

P. Yannoulis: The world economy and the corresponding mix of products and services and therefore the corresponding sources, routes and transportation means are rapidly changing. Ships, being the most cost – effective means of transportation, adapt to the mega trends of world economy. On one hand, the world community is becoming more environmentally sensitive and as a result, new regulations are implemented and enforced, addressing various aspects of environment protection such as the:

- WBTS Convention is addressing the risk by the transportation of noxious organisms from one ecosystem to another.
- MARPOL-Annex VI and corresponding EU Sulphur Directive are addressing Sulphur emissions in ship exhaust gasses.
- MARPOL regulations are addressing emission of NOx and particulate matters.
- Similarly, Montreal Protocol and following related regulations aim at eliminating depletion of HFC from refrigerants.
- IMO EEDI/EEOI and EU MRV regulations aim at improving / decreasing the fuel consumption, i.e. emission of greenhouse gasses (CO2).
- SOLAS Convention and relative amendments address matters of safety on board for crew, passengers and cargo.

On the other hand, present technology allows for the digitalization of all information on the performance of various equipment on board, which, in combination with data analytics software, big data techniques and advanced today communication (internal, on board/external, via satellite) technologies, can provide new forms of ship operation and management techniques, including remote diagnostics, statistics, energy optimization, technical support and maintenance. OCEANKING focuses on all above and represents manufacturers who are market leaders in all of the above fields of application, WBTS, scrubbers, SCR, LNG fuel systems, refrigerating systems, propulsion ESD (energy saving devices), electrical energy saving systems (VFD-variable frequency drives for electrical motors), fuel mass flow consumption measuring devices, life-saving appliances, data analytics and remote communication etc. We have a strategy and vision to look at new ECO technologies to comply with above.

P. Doukas: Are you proud to see that you have positive feedback from those who work on and operate the vessels equipped with OCEANKING's Principals' products and services?

C. Yannouli: Over the course of our company's operation, we believe that we have achieved to be considered by our customers as a reliable partner and as "the extension" of their technical department, supporting them with the right technologies to meet their needs. In many technical areas, such as propulsion and mooring equipment, OCEANKING is considered as a "center of excellence".

We are proud to say that out of the 5.000 Greek vessels, approximately 2.000 are equipped with our Principals' equipment and systems and this is proof that our customers trust us.

Most of all, we are proud to see that we have built this trust we enjoy today mostly due to the assistance we provided in the cases that our Principals' products and services failed to perform. Either in a newbuilding project or during a vessel's operation, some technical problems are bound to come up. In these cases, OCEANKING has ensured a constructive communication channel between our customers and our Principals, in order to find a suitable solution. Equipment does fail, by nature, but we do our best to minimize the impact on our customers' operations.

P. Doukas: Looking at the future could you please picture OCEANKING's future regarding decisions and actions about its growth plans?

C. Yannouli: As mentioned before by Mr. Hassiotis, we do adapt to market change. In terms of our future plans, we will continue to strengthen our portfolio with cutting edge technologies, following market trends and our customers' requirements.

In addition to the functions traditionally performed by OCEANKING, we believe that today the market dictates the need to focus and enhance our technical support to our customers.

More specifically, on one hand, we are building on our in-house expertise on the technologies we promote in two ways:

a. We are hiring new personnel with ship operation experience that will focus on developing OCEANKING technical expertise in regulation driven items and new fields of business.

b. We are hosting at our offices as resident technical people of our Principals, in order to assist us in ensuring fast corrective actions when needed and support us technically.

On the other hand, our aim is to expand our activities and grow in the following fields:

1. We are building up our capabilities, in order to undertake retrofitting subcontracting work for regulation driven items, such as WBTS and scrubbers. Instead of competing with already established engineering companies and contractors, our philosophy is to maximize synergies with other Greek companies offering complementary services as one package. For example, for works that could take place in Greece we are among the founding members of ECOMASYN, which is a cluster of companies collectively offering a "turn-key" solution for attracting retrofitting work for "green technologies" on board ships, such as BWTS, scrubbers, ESD (energy saving devices), etc.

2. Training is another field we want to grow and offer corresponding services to our customers. Our first step is to offer in cooperation with our Principals customized training locally for the technologies we promote, focusing on those that our customers' crew has no previous operating, experience such as the WBTS.

Last but not least, we are expanding our activities in other markets, such as the Oil & Gas sector, building our portfolio and our network and we are carefully examining into expanding our activities in markets other than Greece.

Genuine parts...an inevitable marriage

By Apostolos Bekiaris, Operations Manager, OCEANKING Technical & Trading S.A.

One of the important issues during ship's life is always the maintenance cost of a ship. Ship operators are always trying to reduce the expenses by adopting preventive maintenance schemes, and by purchasing of low cost spares. During the last 6 years, a very big number of new built ships entered the Greek fleet contributing to the reduction of the average age of the fleet. In addition to this, latest technology equipment were installed on board making the ships' operation safer.

Most of the Greek owners, negotiated with the yards and selected advanced systems which, in most cases were expensive and reliable. As it is mentioned above, through a preventive maintenance policy, ship operators try to ensure reliability and safety of ships' systems and crews. However, there is a substantial number of ship operators which focus mainly on low cost spares, avoiding the use of genuine spares from the manufacturer of the systems.

The main reason is the cost, which in most cases is 30% to 60% more expensive than the non-genuine spares. This creates always a dilemma, on which is the most cost effective solution. The answer to this dilemma is not straight forward, since it involves many parameters, which are influenced by several factors. E.g. The age of the ship, the number of years the ship remains under ownership by one shipowner, the cost difference between genuine and non-genuine spares, the importance of the system, the delivery time of spares, the crews' technical level, the terms of payment, etc.

In order to try and extract some conclusions, it is necessary to start from the beginning. First of all when a shipping company orders new ships, it is very important to try and avoid in the makers' list makers which are local, they do not develop their own technology, do not provide adequate technical after sales support and their products / systems are not of reliable and acceptable quality. This is not an easy task, since the price of the offered contract is based on the cost of these makers. Therefore, owners have to put priorities which are different for each ship type. For the very important applications on board, owners should force yard to accept first class makers.

These makers, having developed their own technology can also provide solutions when a malfunction occurs. They provide service through a global support network. The cost of the products of these makers is of course higher. This is expected since apart from the cost of the product itself, continuous development and service support are the two major factors which contribute to the higher price of their products.

The owners or the yards, force these makers to reduce the price of their products at the levels of the local manufacturers. Such request results to a very low, or even, no profit orders for the manufacturers. From the manufacturers' point of view, and in order to ensure profit during ships' operation, provide service and spares at high cost. Consequently, ship operators are looking for cheaper alternatives by adopting maintenance policies including non-genuine spares. At the end, owners although they have selected a first class product, they downgrade the product. It is the same thing as buying a very good quality car and services it at

non authorised service stations with cheap non genuine spares. The quality of the car is getting less and what remains is a car which is similar to the one which was bought but not the same. The brand name has no meaning any more. The same applies on a system by a brand name manufacturer on board ships. Most of the owners believe that after 5 years of ships operation, the quality of the systems on board is the same as

when it was new, but it is not like this. This also generates a danger when it comes to important and safety systems which have been maintained them not according to manufacturers instructions but in accordance to annual budget of the shipowners. However, to be honest, this does not mean, that the offered services by the manufacturers should be very costly. It should be understood that in most cases, high after sales support cost leads to the lower return of gross income percentage from spares. I mean that if a maker has products on board 100 ships, if he offers expensive spares, he might end up with getting orders for spares from 30 ships.

The rest of the ships are getting spares and services from the non-genuine sources. It is inevitable that the business segment of the maker will be shrink year by year, till is out of business. Quality makers should be able to be strongly supported by shipowners at the very beginning of newbuildings contact negotiations, maintaining a good price at the yard, and in return, they should be able to provide good after sales support at acceptable cost level for the shipowners. Makers should provide cost effective maintenance schemes, proving to owners that the cost per running hour of their products is lower than any other scheme. They should provide training for the crews, in order to be able to operate the systems efficiently, safely avoiding breakdowns. Ship operators should adopt new maintenance policies like service agreements, spare parts deals, remote diagnostics systems, minimizing the need of service engineer attendance and down time.

Through these policies, a maker can be closer to the owners, getting valuable feed back from the systems performance thus providing improvements which ensure the reliability of the systems. In addition this, close relation contributes to the development of safer products by the manufacturers. As a conclusion, it can be said that shipowners and makers are getting "married" through ships' operation. As it is known, a marriage can last and be beneficial for both parties, as long as, there are "give and taking", no cheating, and mutual support among both parties. Today's ships are equipped with advanced and complicated technology and only through such "marriage" a ship can be operated cost effectively and safely.



Best practices in Digitalization

By Panagiotis Pollalis, Electrical/Electronic Sales Engineer, OCEANKING Technical & Trading S.A.



During the last years Shipping companies have focused on the benefits of New Technologies concerning information and satellite communication systems. Shipping community has realized that this kind of technology is necessary for an effective fleet management and optimization of cargo transportation, either on board or from shore. This makes possible, not only the collection, the analysis

and the economic storage of big data, but also information access from different decision making levels.

Nowadays ships' specification has become more demanding, especially concerning, control and monitoring system for propulsion, navigation automation etc. as well as communication systems. This kind of technology "produces" a big data collection and analysis which is performed through state of the art technology systems.

Systems like AMS, propulsion control, navigation control data IP communication are offering cost effective infrastructure, reduction in supply costs. We at Oceanking having already considered the necessity of this new technology in shipping as well as its importance for the effective management of shipping companies' fleets, we have established cooperation with companies which are leaders in this field.

Through the technologies of our Principals, concerning communication, we provide IP (Internet Protocol) technology, which ensures satellite communication, big data transfer as well as cyber security

The multi-line communication network technology is transmitting network signal TCP/IP based through power cable (telephone wire and speaker) and Coaxial cable (CCTV & TV) which are already installed in the ship. If the network should be additionally installed into the specific section of new or ongoing shipbuilding project, its technology makes the communication network available without extra cable routing.

By using the installed cable, network communication is properly operated without the need of extra cable installation. The cost of supply and installation is minimized while it can also dramatically reduce the time of construction, since one cable "CAT 7" can integrate all communication devices. In this respect this multi-line communication network technology provides IP phone, IP clock, IP CCTV, IP Entertainment systems, Video conference, Wireless network, Security system, Digital information display,

This new practice allows to multiple users, to select among a wide range of functions, according to their needs, providing audio and data communications, based on latest telecommunications technology. Among those critical functions are an integrated firewall, group calls, call prioritization etc. All aforementioned enable also, the effective and secure provision of audio and data services.

The Shipboard Management, Marine Cloud Server and Multi Line Communication Systems enable for additional expansion only with the installation of a simple modem and simultaneous access to 1:32~1:238 nodes, is also available. Furthermore with the Ship Cloud Server, the Ship Cloud Layout & Function built on embedded server and optimized for vessel's special environment, shipping companies can reduce maintenance costs for security, operation and asset management. This is achieved by "transferring" the virtual environment centralized clouding computing technology in the vessels.

It is applied by a simple connection with each company's preferred operating system and program through the network without the need of installing additional applications or data, using a 'Thin Client' that performs a role as an only terminal. Based on actual user-oriented UI, the users can solve problems on their own, without needing the attendance of a technician during operation. In addition users can manage onboard, network resources efficiently, as they can monitor the server and operation information at any time

For existing vessels, initial introduction cost can be reduced, as cloud-based environment can be constructed by supplying server to the computer in use. Considering that replacement, cycle is 5 to 10 years, the maintenance cost is reduced by 40% compared to the server and client pc (5sets) of existing systems.

A Large Touch Screen Monitor is installed to the front with 10.4 LCD touch panel, which give the possibility to the user to understand the server's operating status at a glance, without additional monitor. This facilitates the whole procedure i.e. to deal with the problems with just a few touches. In order to ensure security, every important data is installed on a ship cloud server. This way the control of data is centralized. In case of consignment management or redelivery of vessel, important data leakage, can be prevented, because it doesn't leave any important data anywhere on the ship if HDD of server is removed. Data can be protected from malicious code or virus by updates via satellite twice-daily. When updated, you can also reduce satellite communication costs since the data is transmitted through a very high compression ratio.

The outer shell and ship cloud internal hardware are designed to withstand high temperature and high humidity environments as efficiency deployment of cooler considering heating and ventilation.

In addition there is an application of Recovery Program, which can minimize the data loss and save schedule back-up due to the self-developed recovery software. Also, it prevents data loss in the event of a blackout since it has the battery inside of ship cloud.

Important data of server can be double backed up in the way of mirroring the same as hardware back-up. The schedule will be backed up with a self-developed recovery solution. And you can easily recover it at a point you want during the failure with software.

All aforementioned possibilities are only a small part which is offered nowadays through ship digitalization, which is relatively new technology. Today Shipping companies are adopting this technology, making significant investments both on acquiring such systems as well as on training of their people since they have realized that apart from the economic benefits they can get, they can also obtain simpler procedures and better management of data.

*Your trustworthy partner
for **future** ship technologies
... **today***

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