

TERMS OF REFERENCE

DESIGN, DEVELOPMENT, DELIVERY, INSTALLATION, TESTING AND COMMISSIONING OF QBANK SYSTEM AND HARDWARE REQUIREMENTS FOR THE MARINA COMPETENCY ASSESSMENT SYSTEM (MCAS)

I. BACKGROUND AND LEGAL BASES

Pursuant to Republic (RA) Act No. 10635, the Maritime Industry Authority (MARINA) assumed the powers and functions of the Professional Regulation Commission (PRC) and the National Telecommunications Commission (NTC) relative to the issuance, validation, verification, correction, revocation or cancellation of certificates of competency, endorsement, proficiency and documentary evidence required of all seafarers and all such other matters pertaining to the implementation of the International Standards of Training, Certification and Watchkeeping (STCW) for Seafarers Convention, 1978, as amended.

The MARINA is mandated to ensure that the examination, licensing and certification system for marine deck and engine officers are in accordance with the requirements prescribed under the Convention. Further, all powers, duties and functions of the PRC on examination, licensing and certification system for marine deck and engine officers as provided in RA No. 8544, otherwise known as "*The Philippine Merchant Marine Officers Act of 1998*," is exercised by the MARINA.

The Philippines, thru the MARINA, was inspected by the European Commission in 2017. One of the shortcomings on Assessment of Competence of seafarers noted in Assessment Report is that "The Board of Examiners (BOE) did not follow the approved quality procedures for validation of questions to be uploaded into the database."

As part of the continued effort of MARINA to address the said shortcoming, the MARINA, a government agency established pursuant to Presidential Decree No. 474 and attached to the Department of Transportation (DOTr), initiated to establish a QBank System that will systematically follow the quality procedures as well as relevant STCW Circulars on assessment of competence (STCW Circular Nos. 2018-08 and 2018-09). This undertaking is included in the submitted "Timetable for the Approval and Implementation of New Assessment System" to the European Commission on April 2018 and expected to be verified by the EC by the end of 2019.

II. OBJECTIVE

This project is initiated to provide a QBank System that will be used in test item construction, and its review and verification, wherein test items shall be designed and developed in accordance with the Table of Specifications (TOS) prepared by the Administration to ensure alignment of the test items to the level of

responsibility and corresponding competence and KUPs in the STCW Code, as amended.

III. APPROVED BUDGET FOR THE CONTRACT

The Approved Budget of the Contract (ABC) for the project is **FOUR MILLION PESOS (4,000,000.00)** General Appropriations Act of 2019 Capital Outlay inclusive of all applicable government taxes and charges.

IV. VENDORS/BIDDERS QUALIFICATIONS

1. The Bidders shall have at least three (3) years of experience in the design, development, delivery, installation, testing and commissioning of Information System.
2. The bidders should have been operating in the Philippines for at least three (3) years and is registered with SEC or DTI.
3. The bidders must have completed at least three (3) similar projects in the design, development, delivery, installation, testing and commissioning of Information System and should be vouched by a Certificate of Acceptance.
4. The bidders must submit, in addition to the bidding documents and in a separate envelope, A CERTIFICATION, UNDER OATH, CERTIFYING THAT THEY HAVE NO PENDING CASE(S) AGAINST THE GOVERNMENT.

V. SCOPE OF THE PROPOSED SYSTEM

Supply and delivery of resources necessary to the implementation of the QBank System.

- Automation of test items construction in accordance with the TOS for the following level of responsibilities:
 - a) Chief Mates and Masters on Ships 500 Gross Tonnage or More;
 - b) Officer-In-Charge of a Navigational Watch on Ships 500 Gross Tonnage or More;
 - c) GMDSS Radio Operators on Ships Required to Participate in GMDSS
 - d) Chief Engineer Officers and Second Engineer Officers on Ships 750 kW Propulsion Power or More; and
 - e) Officers in Charge of an Engineering Watch on Ships 750 kW Propulsion Power or more
- Review and verification of constructed test items
- Generation of statistical data and reports
- Transmission of data, as required, to Pilot Testing Server

VI. FEATURES

- User accounts can be created.
- Accessibility and functionalities of each user accounts are limited as defined.
- Facility for future expandability of data.
- Reports can be presented on a graphical format whenever applicable.

- Performs generation of various user defined reports.
- Multi-level security.
- Integrated system.
- Provides complete system documentation, users and operators manual.

VII. SYSTEM USERS

a) Subject Matter Experts (SME) or the Board of Examiners (BOE)

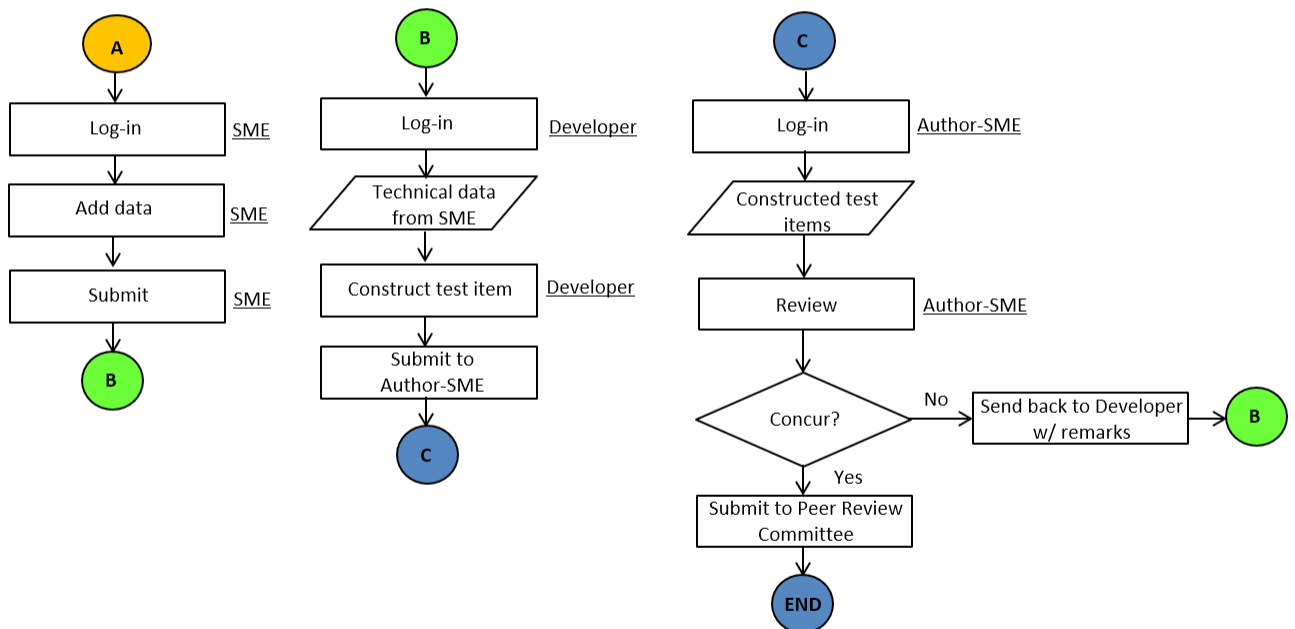
- Technical experts that provide technical data to the Test Items Developer and serve as a member of Peer Review Committee during the conduct of review and verification.
- The BOE are composed of Board of Marine Deck Officers (BOMDO) and Board of Marine Engineer Officers (BOMEEO)

b) Test Item Developer

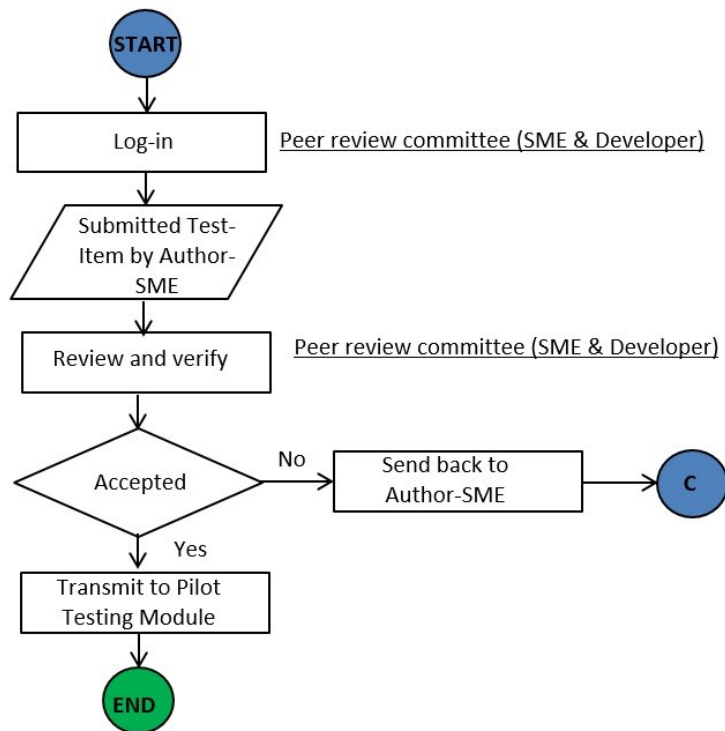
- MARINA personnel with pedagogical background assigned to construct test items out of the data provided by SME.

VIII. FLOW CHART

Construction of Test Items



Review and Verification of Test Items



IX. GENERAL REQUIREMENTS

a) Test Item Construction

- Test items shall be in accordance with the Table of Specifications (TOS) which will be provided by the Board of Examiners (BOE)
- Every test item shall be tagged in according to its Thinking Skills specified in TOS
- Each test item shall have its Unique Question ID and shall have a “Birth Certificate” that consists of questionnaire, choices, reference, correct answer, rationale, name of Author-SME and name of Test Item Developer.

b) Review and verification

- Review and verification will be done by the Peer Review Committee who are also composed of the SME and the Test Item Developer
- During Peer Review, test items for Deck Department which are constructed by BOMDO shall be reviewed only by its members and the assigned Test Item Developers. Likewise for the Engine Department that are constructed by BOME0.

X. FUNCTIONAL SPECIFICATIONS

a) Test Item Construction

1. **Add data** – the SME will input technical data/question including the choices, answer, reference and rationale. Once clicked “Add Data”, it will be transmitted to Test Item Developer’s account.
2. **Construct Test Items** – the Test Item Developer will get the “added data” by the SME for his/her checking based on the principle of test item construction and may edit if necessary. Once properly constructed, he/she will send it back to the Author-SME.
3. **Submit Test Items** – after receiving the constructed test items, the SME-Author will then check the test item, if approved, he will then submit it to Peer Review Committee for review and verification. If not approved, the SME-Author will send it back to the Test Item Developer together with reason of not approving it.
4. **Edit test items** – added/returned test items can be modified by the Test Item Developer; and will undergo the same process.

b) Test Item Construction

1. **Peer Review and Verification** – submitted test items by the Author-SME will be randomly distributed to the members of Peer Review Committee of the concerned Departments (Deck or Engine) for their review and verification. Author of the test items should not review his/her own work. The Review Committee will determine whether the test items are **accepted**, or subject for **further review**.
 - **Accepted test items** shall be automatically transmitted to the Pilot Testing Server. For security purposes, only the Question ID and its “Birth Certificate” shall be left at the QBank System.
Note: The Question ID of transmitted Test Item to Pilot Testing Server shall remain the same for traceability purposes.
 - Those test items that are **subject for further review** shall be returned to its Author provided that the reviewee will indicate remarks/reason why the test item is for review. The author shall be notified by the system if there are test items needed for his/her review/revision. Once reviewed/revised, test items shall undergo the same process of Peer Review and Verification.

XI. DATA GENERATION

The proposed system shall be able to generate a printable statistical data and records as follows:

- Number of technical inputs added by Author-SME on a daily, weekly and monthly basis per level of responsibility, as well as its whole group report in the same manner;
 - Number of test item constructed by Test Item Developer on a daily, weekly and monthly, as well as its whole group report in the same manner;
 - Number of reviewed test items by the Peer Review Committee on a daily, weekly and monthly basis per level of responsibility;
 - Number and percentage of reviewed and verified test items:
 - How many were “Accepted” and
 - How many were “Not Accepted”;
 - Statistical data of reasons for “Not accepted” test items categorized but not limited to as:
 - Question is not clear;
 - Question does not belong in this Competence;
 - Declared answer is incorrect; and
 - Choices needs improvement;
 - Inventory of “discarded” test items after generation of item analysis in Pilot Testing Server;
 - Inventory of “revise” test items after generation of item analysis in Pilot Testing Server;
- (After the conduct of pilot testing, a Test Item Analysis will be generated wherein the results will be categorized as “retain”, “revise”, and “discard”. Test items that are categorized as “revise” and “discard” will be transmitted to the QBank System. The “revise” shall undergo the same process of test item construction while the “discard” will be retained to the QBank System for purposes of data retention and/or reference of the SME in future test item construction)*
- Inventory of test items transmitted by the MARINA Competency Assessment System (MCAS) to the QBank System that are subject for review and revision after generation of test item analysis in Continual Improvement Phase of Theoretical Examination.

XII. USER ACCESSIBILITIES

a) Test Item Developer

- views technical inputs of SME and constructs test items out of these data;
- construct test items based on SME’s technical input and submits to Author-SME; and
- participates in the review of Peer Review Committee.

b) Author – SME

- provides technical input to Test Item Developer;
- reviews test item constructed by the Test Item Developer based on the data he/she provided
- submits Test Item to Peer Review Committee for their review and verification;
- as a member of Peer Review Committee, reviews test items submitted by the other members of SME;

- reviews and revise pilot tested test items that were categorized as “revise”;
- reviews and revise test items generated from item analysis in Continual Improvement phase; and
- transmits accepted test items to Pilot Testing Server immediately after review and verification.

Acceptable Solution

- Web-based (PHP)

Security and Control

- System should be able to define controls for user and group access levels. Multiple levels of security should be controlled using User-IDs and passwords. Access to menus should be restricted depending on user defined access rights.
- At any point, the system shall not be able to download any information or file from the QBank System.

XIII. GENERAL HARDWARE REQUIREMENTS

No	Item	Qty	Unit
1	Server (QBank)	2	Units
2	Server (MCAS)	4	Units
3	Firewall	1	Unit
4	Server Rack	2	Units
5	Software Development		

Supply, Delivery, Installation and Configuration of the following equipment with specifications:

1. SERVER (QBank)

- 1.1 Form Factor - 1U Rack/2S
- 1.2 Processor - Intel® Xeon® processor E5-2600 v4 or Equivalent
Processor sockets: 2
Chipset: C610
Internal interconnect: Up to 9.6GT/s
Cache: 2.5MB per core
- 1.3 Memory / Max - 2 x 16GB RDIMM, 2133MT/s, Dual Rank, x8 Data Width (8/12 max DIMM slots)
- 1.4 HD Capacity - 4 x 500GB 10K RPM SAS 12Gbps 2.5in Hot-plug Hard Drive (max 8 HDD)
- 1.5 Optical - DVD+/-RW SATA Internal
- 1.6 RAID - Integrated RAID Controller, 2GB Cache
- 1.8 Onboard NICs - On-Board LOM 1GBE (Quad Port)
- 1.9 Power Supplies - Single, Hot-plug Power Supply (1+0), 550W
- 1.10 Static Rail - Ready Rails, Sliding Rails with Cable Management Arm
- 1.11 Keyboard - USB Keyboard

- 1.12 Mouse - USB Optical Mouse
- 1.13 Warranty - Three (3) years next Business Day OnSite
- 1.14 OS –Latest Windows Server
- 1.15 Uninterrupted Power Supply
 - Backup time of at least 9 minutes at full load Load capacity of 2000VA
 - Communication: USB/SNMP
 - On-Line UPS System
 - Input and Output Voltage at 230 VAC with 60Hz
 - UPS battery must have at least 1-year warranty
 - User Interface: LCD with audible alarm
 - Outlet Receptacle: 8 IEC C13 Outlets

2. SERVER (MCAS)

- 2.1 Form Factor - 1U Rack/2S
- 2.2 Processor - Intel® Xeon® processor E5-2600 v4 or Equivalent
 - Processor sockets: 2
 - Chipset: C610
 - Internal interconnect: Up to 9.6GT/s
 - Cache: 2.5MB per core
- 2.3 Memory / Max - 2 x 16GB RDIMM, 2133MT/s, Dual Rank, x8 Data Width (8/12 max DIMM slots)
- 2.4 HD Capacity - 4 x 500GB 10K RPM SAS 12Gbps 2.5in Hot-plug Hard Drive (max 8 HDD)
- 2.5 Optical - DVD+/-RW SATA Internal
- 2.6 RAID - Integrated RAID Controller, 2GB Cache
- 2.8 Onboard NICs - On-Board LOM 1GBE (Quad Port)
- 2.9 Power Supplies - Single, Hot-plug Power Supply (1+0), 550W
- 2.10 Static Rail - Ready Rails, Sliding Rails with Cable Management Arm
- 2.11 Keyboard - USB Keyboard
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3. FIREWALL

- 3.1 1000 base platform, Next generation multi-function firewall with application control NAT, IPv6, HA and Web GUI management S/W 1Gbps UTP x 6 ports, built-in, configurable (Max 4 ports for bypass) 1Gbps Fiber x 2 ports, built-in, configurable
- 3.2 Anti-malware protection, Application filtering, ASIC VPN, DMZ port, Firewall

protection , Intrusion Prevention System (IPS) , URL filtering , VPN support ,
Wall mountable , Web threat protection

3.3 8x5 tech support; 24x7 phone. Email and onsite support

3.4 warranty and support: 1 year

4. RACK (DATA) CABINET

4.1 42 U Height

4.2 Must have removable tail-bars at both top and bottom of the rear of the rack

4.3 Can Accommodate four full height PDU's at rear of rack

4.4 Tool less PDU Mounting kit

4.5 Must include the 1U KVM Console with 18.5" LED Display

4.6 Must Include the PDU to support all the Devices (Server, Storage, Switches)

XIV. DASHBOARD REQUIREMENTS

Applications for all the modules shall have a “dash board” functionality that shall retrieve and display statistical requirement of the implementing agency.

The dash board will be design with a catchy and simple template with clear representation of data and information, at the same time the graphics will be simple to reduce the required time for processing.

1. Information and data will be presented in form of charts and graphs that displays statistics with the ability to choose different time scales (today, yesterday, last week, last month, last year and date range).
4. Refresh Rate – this property will determine how often the dashboard will automatically refresh the data for the active dash board panel. A selection from manual refresh, 5 second, 2 minutes, 5 minutes, 15 minutes and 30 minutes refresh rate is required.
5. The following enumerates the list of dashboard panels:
 - a. List of Reminders
 - b. Bar Graph of constructed test items per SME and also per group, in monthly basis
 - c. Bar Graph of constructed test items per level of responsibility in monthly basis
 - d. Pie Graph of reviewed test items divided into “Accepted” and “Not Accepted” test items per level of responsibility in monthly basis

XV. DATABASE REQUIREMENTS

Data Types

- Many data types: signed/unsigned integers 1, 2, 3, 4, and 8 bytes long, [FLOAT](#), [DOUBLE](#), [CHAR](#), [VARCHAR](#), [BINARY](#), [VARBINARY](#), [TEXT](#), [BLOB](#), [DATE](#), [TIME](#), [DATETIME](#), [TIMESTAMP](#), [YEAR](#), [SET](#), [ENUM](#), and Open GIS spatial types.
- Fixed-length and variable-length string types.

Statements and Functions

- Should have a full operator and function support in the SELECT list and WHERE clause of queries
- Should have a full support for SQL GROUP BY and ORDER BY clauses. Support for group functions (COUNT(), [AVG\(\)](#), STD(), SUM(), MAX(), MIN(), and GROUP_CONCAT()).
- Should have a support for LEFT OUTER JOIN and RIGHT OUTER JOIN with both standard SQL and ODBC syntax.
- Should support for aliases on tables and columns as required by standard SQL.
- Should support for MySQL-specific SHOW statements that retrieve information about databases, storage engines, tables, and indexes. Support for the INFORMATION_SCHEMA database, implemented according to standard SQL.
- An [EXPLAIN](#) statement to show how the optimizer resolves a query.
- Independence of function names from table or column names.
- You can refer to tables from different databases in the same statement.

Security

- Should have a privilege and password system that is very flexible and secure, and that enables host-based verification.
- Should have a password security by encryption of all password traffic when you connect to a server.

Scalability and Limits

- Should support for large databases.
- Should support for up to 64 indexes per table.

Connectivity

- Clients can connect to My SQL Server using several protocols:
- Clients can connect using TCP/IP sockets on any platform.
 - On Windows systems, clients can connect using named pipes if the server is started with the enable-named-pipe option. Windows servers also support shared-memory connections if started with the shared-memory option. Clients can connect through shared memory by using the protocol=memory option.
- On Unix systems, clients can connect using Unix domain socket files.

XVI. ADDITIONAL SYSTEM SPECIFICATION FOR ALL MODULES

- The Provider shall ensure that all the software licenses needed for successful deployment and implementation of the **QBank System** will be provided.

XVII. TECHNOLOGY TRANSFER

- The winning bidder must provide free technology transfer for the proposed products. The end user training / workshop can either be conducted in MARINA's premises or vendors training center.
- The bidder must provide a comprehensive training program to concerned personnel that will be involved in the implementation and operation of the modules for the implementing agencies. The bidder must list all personnel to

be trained, sequence of training by group or subgroup and timing required to meet the requirements of the implementation plan.

- The type of training will depend on the function of the participants such as but not limited to System Administration, Database Management, Network Administration, Security Administration, Content Management and others that are deemed necessary in the proper implementation of the modules.

The numbers of participants to be trained are as follows:

1. Three (3) personnel for System Maintenance, Systems Administration, Database Management and Security Administration
 2. Twenty (20) personnel for End-User
- The training must be detailed enough for the technical participants to be able to completely operate and maintain the whole project. The training must also include trouble shooting, preventive maintenance, and business continuity planning/testing, etc.
 - Appropriate training manuals must be provided for each participant. Training manuals must be easy to understand and comprehend.
 - Training and Technology Transfer should be conducted before final project acceptance.

XVIII. PROJECT TIME FRAME

1. The QBank System should be completed within the period of **three (3) months** for:
 - a. Data Gathering, system investigation and system design
 - b. Software Development
 - c. Data Migration
 - d. Training
 - e. User Acceptance and Testing
 - f. Turnover of the QBank System and all documentation to MARINA
2. Delivery of hardware requirements for the MCAS shall be completed within the period of **One (1) month**.

DELIVERABLES	2019											
	MARCH				APRIL				MAY			
	WI	W2	W3	W4	WI	W2	W3	W4	WI	W2	W3	W4
1. ADMINISTRATIVE REQUIREMENT												
Issuance of Notice to Proceed												
2. QBANK SYSTEM												
a. Data Gathering, system investigation and system design												
b. Software Development												
c. Data Migration												
d. Training												
e. User Acceptance and Testing												
f. Turn over of the Qbank System and all documentations to MARINA												
3. HARDWARE FOR MCAS												
Delivery and Installation of Server for MCAS												

XIX. DOCUMENTATION

- The winning bidder must provide complete documentation for every deliverable and at every end of each development stage and milestone which will be submitted to Maritime Industry Authority for approval. The documentation must include all the source codes of the application systems. All documents shall be owned by the Maritime Industry Authority and shall reserve the right to reproduce at no additional cost. All documentation must be written in English and must be available in both soft and paper formats.
- The winning bidder must provide user and system manuals and technical materials of all IT equipment including all of its components. Complete documentation of hardware, software, utility and CDs must be provided including the inventory of components and serial numbers.
- Maritime Industry Authority will have Intellectual Property Rights over the source codes.

XX. BACKUP AND RECOVERY

- The bidder should develop backup procedures and policies in maintaining the application system.
- The bidder should submit a Disaster Recovery Program/Plan. The plan must be detailed enough for all possible disaster such as power outage, computer failure, natural calamities or human error. It must contain the comprehensive procedures necessary to resume to its normal operation in the least possible time. Moreover, the responsibilities of the people involved in the operation must be thorough.

XXI. TECHNICAL SUPPORT

- The Bidder shall provide technical support via telephone/fax, on-site assistance to resolve technical and other related problems. Resolution can be delivered in the form of telephone, electronic and/or on-site resolution. It shall refer to a condition wherein the reported problem is resolved by the Bidder to the satisfaction of the end user.
- The Bidder shall resolve a problem within twenty four (24) hours after it was reported by MARINA thru fax, telephone or email.
- The Bidder/developer shall provide portal intended for monitoring/discussion and reporting on the process of development and implementation.

XXII. WARRANTIES OF THE CONTRACTOR

- The Bidder warrants that it shall conform strictly with the terms and conditions of this Terms of Reference.
- A warranty period of twelve (12) months shall commence upon issuance of the Certificate of Acceptance.
- The Bidder shall neither assign, transfer, pledge, nor subcontract any part or interest therein.

XXIII. CONFIDENTIALITY OF DATA

- The Bidder shall document detailed procedures/techniques in identifying systems security risks and breach(es) and how such shall be handled.
- The **QBank System**, its modules, specifications, data, ideas, technology, and technical and non-technical materials, all or any of which may be derived from any of the foregoing (all of which, individually and collectively, referred to as "Proprietary Information") are confidential and proprietary to the Maritime Industry Authority (MARINA).
- The Bidder agrees to hold the Proprietary Information in strict confidence. Bidder furthermore agrees not to reproduce, transcribe, or disclose the Proprietary Information to third parties without prior written approval of the Maritime Industry Authority (MARINA).

XXIV. VENDOR RESPONSIBILITIES

- To protect sensitive data, the developer/vendor shall sign a Non-Disclosure Agreement (NDA) to protect the data in the system. Likewise, all personnel of the vendor that is involved in the project shall sign an NDA.
- Submits weekly status report detailing the accomplishments, project risks and issues, and next tasks.
- Shall assign the following personnel for the development and implementation of the project
 - One (1) full time Project Manager
 - At least Two (2) full time Developers (experience in web development and Java)
 - Database Administrator

- End-User Trainer
- Perform capacity planning and provide hardware and network recommendations to ensure sufficient infrastructure is in place prior to full rollout.
- Perform web vulnerability assessment / penetration testing to verify the security configuration of the application.
- Ensure all deliverables are submitted on time.
- Ensures that key project risks that impact the project are monitored and visible to all project stakeholders.
- Provides warranty and 8 to 5 technical support for 1 year after the system has been deployed for production use.
- The vendor shall provide all the software licenses needed to ensure successful deployment and implementation of the **QBANK SYSTEM**
- The vendor shall provide 1 year warranty and support for the system after the system has been rolled-out to production.
- Provision of all documentation (user, administrative and technical) to MARINA personnel including necessary handover and training. Documentation shall include, but not limited to the following:
 - User Documentation
 - Requirements Specification
 - User's Manual / FAQ
 - Administration Manual
 - Technical Documentation
 - Technical Architecture
 - Architecture Framework
 - Class Diagram, Sequence Diagram
 - Entity-Relationship Diagram
 - Database Schema
 - Database Dictionary
 - System Installation Manual
 - Source Codes

XXV. TERMS OF PAYMENT

Maritime Industry Authority (MARINA) shall pay the winning Bidder fifteen (15) days upon acceptance and complete turnover of the project to MARINA.

XXVI. MARINA OPTION

The Maritime Industry Authority technical personnel must review and conduct a software and hardware evaluation of the delivered service and equipment based on its functions. MARINA will also conduct User Acceptance and Testing for all customized/developed software components. All deliverables mentioned above should be checked by MARINA technical personnel and complied by the vendors before the final acceptance and turnover of the project. The MARINA will retain ownership over, and control of, all data and portal operations relevant.