INTERNATIONAL MARITIME INDUSTRIES

SCOPE OF WORK FOR AR, VR & XR TRAINING

Powered By Saudi Aramco   بدعم من أرامكو السعودية
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1 COMPANY BRIEF

International Maritime Industries Company (IMI, hereinafter COMPANY), a part of King Salman International Complex for Maritime Industries and Services (KSIC), will be a world class Maritime Yard, being constructed at Ras Al Khair (RAK) in the Eastern province of Saudi Arabia. COMPANY will be a fully integrated state-of-the-art facility capable of Ships & OSV building, Jack-up rigs construction and Maintenance, Repair and Overhaul services for ships and rigs. The COMPANY is a joint venture of Saudi Aramco, Lamprell Energy Limited, Bahri, and Hyundai Heavy Industries (HHI).

2 INTRODUCTION

COMPANY is seeking to have a qualified CONTRACTOR for software, hardware, accessories, applications, integration, and support for workforce training using augmented reality/ virtual reality/mixed reality technologies.

The required training solutions should be based on AR/VR/XR and built on top of the existing COMPANY 3D representation, which is built using Unreal Engine.

The training solution shall be capable of deploying multiple video scenarios from various business areas, including, but not limited to, HSE, Marine operation, security, asset management, warehousing, fire department, and welding workshop.

3 ABBREVIATIONS

WORK	:	The services to be provided by the CONTRACTOR to COMPANY under this SoW.
SoW	:	Scope of Work

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HSE	:	Health, Safety and Environment
AR	:	Augmented Reality
VR	:	Virtual Reality
XR	:	Mixed Reality

4 PROJECT OBJECTIVES

This project aims to establish a comprehensive and impactful AR/VR/XR training framework for the COMPANY to achieve the following objectives:

- **Enhanced Workforce Skill Development:**
  - Reduce overall training time compared to traditional classroom-based methods.
  - Increase knowledge retention as measured through post-training assessments.
  - Develop proficiency in complex equipment operation and high-risk procedures within a safe, simulated environment.
- **Improved Safety and Operational Efficiency:**
  - Decrease safety incident rates in areas directly addressed by the AR/VR/XR training scenarios.
  - Standardize training procedures across COMPANY facilities, ensuring consistency and reducing errors.
  - Enable rapid upskilling of new employees and cross-training for existing staff on new equipment or processes.
- **Innovation and Workforce Engagement:**
  - Position COMPANY as a leader in adopting cutting-edge technologies for workforce development.
  - Increase employee satisfaction and motivation by providing immersive and engaging training experiences.
- **Long-Term Cost Optimization:**

- o Reduce the need for travel and physical training facilities associated with traditional training methods.
- o Minimize equipment downtime due to improper handling or maintenance errors.

Measurable Success Criteria

To track project success, the following key performance indicators (KPIs) will be used:

- **Training Completion Rates:** Track the percentage of employees who successfully complete assigned AR/VR/XR training modules.
- **Knowledge Assessments:** Utilize pre- and post-training knowledge quizzes to measure improvement in comprehension.
- **Skill Simulations:** Conduct performance tests in the virtual environment to evaluate practical proficiency.
- **Safety Incident Reports:** Analyze trends in safety incidents to identify potential correlations with areas covered by AR/VR/XR training.
- **Employee Feedback:** Collect regular feedback from trainees regarding the effectiveness and user experience of the training.
- **Return on Investment (ROI) Analysis:** Calculate the cost savings and efficiency gains resulting from implementing the AR/VR/XR training platform.

5   BUSINESS REQUIREMENTS

5.1   Overall requirements

5.1.1   Solution Requirements

- Multiplayer Collaboration: The solution shall enable real-time collaboration between multiple trainees within the same virtual training scenario. This includes features like voice communication, shared object manipulation, and the ability to see each other's virtual avatars.
- Real-time Error Detection and Feedback: The solution shall incorporate mechanisms to identify incorrect actions or deviations from standard procedures during training sessions. It should provide immediate feedback to

the trainee, including visual cues, audio instructions, or haptic feedback (if supported by hardware).

- Trainee Analytics: The solution shall include analytics tools that track trainee performance data across sessions. This allows for the identification of common errors, knowledge gaps, and areas where trainees may need additional support.

- Dynamic Weather Simulation: The solution shall provide the capability to modify weather conditions within training scenarios, including elements like rain, fog, wind, and varying light conditions to simulate realistic environmental challenges.

- Instruction Design: The solution shall incorporate a user-friendly authoring environment that allows the creation of structured training content aligned with international standards. This could include templates, step-by-step guidance tools, and the ability to import existing instructional materials.

- Learning Management System (LMS) Integration: The solution shall seamlessly integrate using the specified BOOMI middleware with COMPANY's existing LMS. This will enable features like single sign-on, automatic enrollment, progress tracking, and reporting.

- Offline Functionality: If trainees will need access in areas with poor connectivity, consider solutions that allow for downloading content and synchronizing progress later.

- Accessibility: Ensure the solution adheres to accessibility guidelines (e.g., WCAG) and provides options for users with disabilities.

- Data Privacy and Security: The solution must have robust measures to protect user data, including encryption, access controls, and adherence to relevant regulations (e.g., NCA, GDPR).

- Performance Optimization: To provide a seamless user experience, the solution should be optimized for performance on the target hardware, taking into account factors like rendering complexity and network bandwidth.

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5.1.2 CONTRACTOR Requirements:

- The CONTRACTOR shall utilize the existing COMPANY yard 3D representation as a training environment to ensure more realistic video scenarios.

- The CONTRACTOR should deploy the solution on-premises.

- The CONTRACTOR shall be able to develop video scenarios with different training durations, starting at 5 minutes and ending at 10 minutes.

5.1.3 Headsets and Peripherals Requirements:

- **Display:**
  - Type: LCD or OLED (consider cost vs. visual fidelity needs)
  - Resolution: [Minimum pixels per eye, e.g., 1440 x 1600]
  - Field of View: [Minimum horizontal FOV, e.g., 100°]
  - Refresh Rate: [Minimum Hz, e.g., 90 Hz]
- **Tracking:** 6DOF (full positional and rotational tracking)
- **Comfort:** Adjustable fit, lightweight design, comfortable padding for extended use.
- **Audio:** Integrated headphones or external audio solution compatibility.
- **Additional Features:**
  - Eye-tracking
  - Passthrough capability for augmented reality/mixed reality scenarios
- **Standalone Processing:** All processing onboard the headset with extended battery life requirements
- **Hand Controllers:** Included, with ergonomic design and accurate tracking.
- **Haptic Feedback Devices (Optional):** Specify the type of feedback needed (vibration, resistance, etc.) and the body areas targeted (e.g., hands, torso).
- **3D Cameras (Optional):** Specify resolution and any software requirements if used for content creation.
- **Hardware Support:** Provision of clear documentation, troubleshooting guides, warranty terms, and OEM support.

- **Scalability:** Ability to supply and support a large number of devices (based on workforce size).
- **Compatibility:** CONTRACTOR to ensure any chosen hardware is fully compatible with the AR/VR/XR platform and other devices.

5.1.4   Platform Requirements:

The selected AR/VR/XR platform shall meet the following requirements:

Platform and Technical

- **Device Compatibility:** Support for selected headsets, operating systems, and peripherals.
- **Deployment Model:** On-premise
- **Performance:** Maintain consistent frame rates, low latency, and high-fidelity rendering, ensuring a seamless user experience.
- **Networking:** Support minimum bandwidth usage, low latency (especially for multiplayer scenarios), and offline capabilities.

Content Development

- **Authoring Tools:** Provide an intuitive authoring environment suitable for users with varying technical expertise. Essential features include:
  - o Import of 3D models, images, videos, and audio in industry-standard formats.
  - o Tools for animation, interaction design, and content customization.
  - o Ability to incorporate assessment elements (quizzes, simulations).
- **Content Management:** A secure content library with version control, metadata tagging, granular access controls, and search functionality.

User Experience

- **User Interface:** An intuitive and accessible interface tailored to the target devices and input methods.
- **Accessibility:** Incorporate features to support users with disabilities (e.g., captions, adjustable text, color-contrast options).

- **Progress Tracking:** Mechanism to save and report individual trainee progress, completion status, and assessment results.

Analytics and Reporting

- **Data Capture:** Collect granular training data (interactions, choices, completion times, eye-tracking data where applicable).
- **Reporting:** Provide a customizable dashboard for visualizing trainee performance (individual and group-level), content effectiveness, and identifying areas for improvement.
- **Export Options:** Allow data to be exported in standard formats for integration with ERP or analytics systems.

Security and Compliance

- **Data Security:** Implement robust encryption for user data at rest and in transit.
- **Authentication and Authorization:** Secure user login system with role-based access controls.
- **Compliance:** Adherence to local data privacy regulations and industry-specific security standards.

Additional Requirements

- **Scalability:** Ability to support a large workforce and potential future expansion of training content.
- **OEM / Vendor Support:** Provide comprehensive technical support, clear documentation, regular software updates, and timely security patches.

5.2 Mandatory Solution Components

Following are the major solution components as listed below:

- The CONTRACTOR shall provide the required hardware, accessories to run the training scenarios.
- The CONTRACTOR shall be able to deliver 50 video scenarios. These scenarios are divided into 3 categories, i.e. Low, Medium and High complexity. Our estimate of the complexity is based on the time and

coverage of process and equipment needed for performing the scenario. Following is a guide for the complexity percentage:

- o Low Complexity – 20%
- o Medium Complexity – 30%
- o High Complexity – 50%

- **Hardware and Accessories:**
  - o **Head-Mounted Displays (HMDs)**: The CONTRACTOR shall propose multiple Head-Mounted Display options and submit it with the technical proposal.
  - o **Controllers/Input Devices**: The CONTRACTOR shall propose multiple options for Controllers/Input Devices and submit them with a technical proposal.
  - o **Processing Units:** The CONTRACTOR shall submit minimum server specification requirements to run the project and attach the documents in the technical proposal.
  - o **Network Requirements**: The CONTRACTOR shall submit minimum network requirements to run the project and attach the documents in the technical proposal.

- **Software:**
  - o **Development Platform:** The CONTRACTOR shall be able to develop the training scenario using Unreal Engine.
  - o **Content Creation Tools:** List authoring tools, 3D modeling/animation software, and any specialized packages needed for content development.
  - o **AR/VR Runtime Environment:** The CONTRACTOR shall specify the necessary software to run the developed experiences on the target hardware.
  - o **License Management:** The CONTRACTOR shall submit the description of the license types (perpetual, subscription, per-seat) for all required software components and submit it with the technical proposal.

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- **Content Development:**
  - **Number of Scenarios:** The CONTRACTOR shall be capable of deriver 50 training scenarios.
  - **Scenario Complexity:** 25 High-Complexity, 15 Mid-Complexity and 10 Low-Complexity.
  - **Content Localization:** The CONTRACTOR shall deliver the scenario content with multiple languages including Arabic, English and Urdu.
- **Deployment and Management:**
  - **Device Management:** The CONTRACTOR shall describe how HMDs and other hardware will be set up, configured, updated, and maintained. Consider using a Mobile Device Management (MDM) solution.
  - **Content Distribution:** The CONTRACTOR shall specify how scenarios and updates will be distributed to the HMDs (sideloading, over-the-air updates, centralized content server).
  - **User Authentication:** The CONTRACTOR solution shall support the user authentication feature by integrating with the COMPANY identity systems.
- **Support and Maintenance:**
  - **Hardware Support:** The CONTRACTOR shall propose the hardware support levels provided for hardware components (replacement, on-site repair, etc.) and turnaround times.
  - **Software Support:** The CONTRACTOR shall outline the levels of technical support available for the software stack (help desk hours, bug fixes, feature updates).

6 SCHEDULE:

The complete scope of this project shall be completed within 18 calendar months.

7 IMPLEMENTATION REQUIREMENTS

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To ensure efficient and timely delivery of the AR/VR/XR training solutions, the CONTRACTOR must propose a comprehensive and detailed implementation timeline. This timeline must consider the various complexities as defined in Section 5, aligning with the weighted factors contributing to scenario complexity. The timeline proposal should adhere to the following guidelines and requirements:

7.1   Timeline Development Guidelines

- Project Initiation: The CONTRACTOR shall outline the initial steps for project kickoff, including preliminary assessments, hardware and software setup, and initial stakeholder meetings. This phase should ensure all necessary groundwork is laid for a successful project start.

- Scenario Development Phases: Based on the complexity levels (High, Medium, Low), the CONTRACTOR shall segment the timeline into distinct phases, each dedicated to developing video training scenarios within a specific complexity bracket. Each phase should detail the development, testing, and revision stages required for the scenarios within its complexity level.

- Integration and Testing: Following scenario development, the CONTRACTOR must allocate time for the integration of these scenarios with the COMPANY learning management system through IBM BOOMI middleware, ensuring smooth operation and accessibility. This phase should include thorough testing with real users to identify and rectify any issues.

- Training and Implementation: Time must be set aside for training the company's staff on the new system, including the use of hardware, navigation of the software, and interpretation of data analysis tools. This phase should culminate in the full implementation of the training solution in a live environment.

- Milestones and Review Points: The timeline should include specific milestones and points for review, allowing for assessment of progress and adjustments to the timeline as necessary. These checkpoints will enable

both the CONTRACTOR and COMPANY to ensure the project remains on track and meets the desired quality standards.

7.2 Timeline Proposal Requirements

- Detailed Schedule: The proposal must include a detailed schedule, outlining all tasks, their start and end dates, and the responsible parties. This schedule should be broken down by week or month, depending on the overall project length.

- Resource Allocation: Clear identification of the resources (human, technical, financial) allocated to each phase of the project, ensuring that there are sufficient resources to meet the project demands without delay.

- Risk Management: An outline of potential risks to the timeline and their mitigation strategies, ensuring that the project can adapt to unforeseen challenges without significant delays.

- Flexibility: While adhering to the overall project deadline, the timeline should incorporate flexibility to accommodate minor delays or changes in scope, ensuring that such changes do not adversely impact the project delivery or quality.

7.3 Approval and Adjustment Process

The proposed timeline is subject to approval by the COMPANY. Following submission, the COMPANY reserves the right to request adjustments to ensure the timeline aligns with operational capacities and project goals. The CONTRACTOR must be prepared to work collaboratively with the COMPANY to finalize the timeline, ensuring a mutual agreement is reached and documented before project commencement.

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8   TECHNICAL PROPOSAL REQUIREMENTS

The CONTRACTOR is required to submit a detailed technical proposal for the proposed solution. The technical proposal shall cover, at minimum, the following sections:

- Company Profile
- Similar project references
- Team profile and CVs
- Implementation and project timelines
- Software and Platform Specifications
- Software Licensing and Support
- Hardware Specifications – Devices and Peripherals
- Hardware Specifications – Infrastructure
- Integration and Compatibility Specifications
- Project Management
- User Training
- Quality Assurance and Change Management
- OEM / Vendor Support
- Any other sections

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