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| Singapore Maritime Institute  Application Form for  **Asset Integrity & Risk Management R&D Programme**  December 2014 |  |

**SINGAPORE MARITIME INSTITUTE (SMI)**

**CALL FOR PROPOSALS**

**ASSET INTEGRITY AND RISK MANAGEMENT**

**RESEARCH & DEVELOPMENT PROGRAMME**

**1 DECEMBER 2014 TO 27 FEBURARY 2015**

1. In oil & gas E&P, safe and reliable operations are of paramount importance to the industry. Asset integrity should never be compromised and risk management is critical to ensure lives and marine environment are safeguarded.
2. With enhanced oil recovery techniques, operators are stretching the existing reserves with assets that are reaching their design service life. These aged assets are often susceptible to failures due to mechanical degradations and harsh offshore environment.
3. Oil exploration has also inevitably moved into deep-sea as shallower oil wells become depleted. The offshore assets are installed in deeper water and are increasingly inaccessible. The associated cost of asset maintenance increases exponentially for deep-water regions resulting in the need for technological innovations in asset integrity & risk management. Integrity assessment and risk management solutions, anticipation of possible failures of systems and emergency response plans in the event of asset failures would be critical.
4. SMI through its engagements with the industry and academia has identified the following research thrusts and corresponding research focus areas under the grant call:

|  |  |
| --- | --- |
| **Research Thrusts** | **Research Focus Areas** |
| **Software Development**  This thrust will focus on simulation & modelling of main failure mechanisms as well as incidents. | * Corrosion modelling * Simulation of incidents * Simulation of loading and induced fatigue/stress |
| **Hardware Development & Deployment**  Apart from new sensor & system development, this thrust will focus on the customization and optimisation of existing sensors with low hardware overheads. | * New sensor development * Customization and deployment of existing sensors * Wireless sensor networks |
| **New Asset Installation**  This thrust will focus on simulation of installation techniques, particularly in deep water and associated risk identification and management. | * Simulation of installation techniques * Risk identification and management |
| **System Level Management**  This thrust will focus on the development of integrity assessment models based on possible use of historical data for model refinement. | * Development of integrity assessment models * Refinement of prediction models based on iterative approach |

1. The offshore assets covered include offshore structures, subsea and down-hole equipment. The key research objectives are
   1. Identification of safety critical elements (SCEs)

The weakest structural components that are most susceptible to external forces, cyclic loadings and harsh environment known as safety critical elements should be identified.

* 1. Reduction of reliance on manual inspection

The inaccessible assets in deeper water and harsher environment drive the need for remote and autonomous inspection and maintenance which are increasingly reliant on sensor based technologies.

* 1. Low hardware overheads

Cost is one of the major considerations when sensors and wireless systems are installed. Such overheads include the cost of manufacturing the sensors and systems, power requirement as well installation compatibility with the existing assets.

* 1. High reliability systems under harsh environment

The increasingly harsh environment at deeper water with strong waves and currents as well as deeper wells with hostile chemicals and high pressure high temperature (HPHT) pose significant technical challenges. Sensors and systems must survive such environment with high reliability.

**About the Asset Integrity & Risk Management R&D Programme**

The Asset Integrity & Risk Management (AIM) Research and Development (R&D) Programme is established to address industry challenges and develop R&D capabilities in areas relating to offshore asset integrity and risk management in oil & gas exploration and production (E&P). A total research grant amounting to S$6 million has been allocated to promote research through this open thematic grant call for proposals. This call for proposal under the AIM R&D Programme aims to seek proposals involving innovative ideas, approaches and technologies towards improving the safety of offshore E&P activities.

Applicants of this grant are strongly encouraged to collaborate with other institutions and the offshore industry. The evaluation panel will comprise members from SMI, A\*STAR and relevant offshore industry representatives.

All approved projects will be subject to the SMI Grant Terms and Conditions.

The submission and other details for this grant call are as follows:-

**Date of call for proposal: 1 December 2014**

**Deadline for submission of proposal (hard & soft): by 27 Feburary 2015, 1200HR**

**Date of announcing the outcome of the grant call: by 2nd Quarter of 2015**

**Please submit your completed hardcopy proposal to:**

|  |
| --- |
| Ms Serene Soh  Singapore Maritime Institute  460 Alexandra Road  PSA Building #17-00  Singapore 119963 |

**And email your completed softcopy proposal (in both PDF and DOC format) to:-**

[smi@maritimeinstitute.sg](mailto:smi@maritimeinstitute.sg)

**APPLICATION FORM**

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**[FOR OFFICIAL USE ONLY]**

Application ID:

1. **SUMMARY OF PROPOSAL**

Title of Project

(In no more than 25 words, provide the title of the project. Be descriptive rather than general.)

|  |
| --- |
|  |

Duration of Project

|  |  |
| --- | --- |
|  | Month(s) |
|  |  |

Project Principal Investigator, Co-Investigators & Collaborators

(Please indicate # against the name of the principal investigator)

|  |  |  |
| --- | --- | --- |
| S/N | Name of Principal Investigator / Co-Investigators | Organisation |
| 1 |  |  |
| 2 |  |  |
| 3 |  |  |
| 4 |  |  |

Academic Collaborators (Overseas / Non-Public Research Performers)

|  |  |  |
| --- | --- | --- |
| S/N | Name of Academic Collaborators | Organisation |
| 1 |  |  |
| 2 |  |  |

Industry Collaborators

|  |  |  |
| --- | --- | --- |
| S/N | Name of Industry Collaborators | Organisation |
| 1 |  |  |
| 2 |  |  |

Research Budget Requested

|  |  |
| --- | --- |
| Item | Total  (S$) |
| Expenditures on Manpower (EOM) |  |
| Equipment (EQPT) |  |
| Materials & Consumables (OOE) |  |
| Travel Related Expenses |  |
| TOTAL |  |

Amount of funding sought from SMI

|  |  |
| --- | --- |
| S$ |  |

1. **TITLE OF PROJECT**

(In no more than 25 words, provide the title of the project. Be descriptive rather than general.)

|  |
| --- |
|  |

1. **TIMELINE**
   1. DURATION OF PROJECT:

|  |  |
| --- | --- |
|  | Month(s) |

* 1. PROPOSED START AND END DATES:
     1. START DATE (MM/YY):

|  |  |
| --- | --- |
| MM | YY |

* + 1. END DATE (MM/YY):

|  |  |
| --- | --- |
| MM | YY |

1. **PROJECT INVESTIGATORS, CO-INVESTIGATORS & COLLABORATORS**
   1. PRINCIPAL INVESTIGATOR (PI)

(Please note that only one PI per application is allowed. Please attach at least **1-page CV** highlighting the relevant experiences)

|  |  |  |  |
| --- | --- | --- | --- |
| Name |  | Organisation | Email |
| 1 |  |  |  |

* 1. CO-INVESTIGATORS

(Please add if there are additional co-investigators and attach a 1-page CV for each co-investigator highlighting the relevant experiences)

|  |  |  |  |
| --- | --- | --- | --- |
| Name |  | Organisation | Email |
| 1 |  |  |  |
| 2 |  |  |  |

* 1. ACADEMIC / INDUSTRY COLLABORATORS

(Please add if there are more collaborators and attach a 1-page CV for each collaborator highlighting the relevant experiences)

|  |  |  |  |
| --- | --- | --- | --- |
| Name |  | Organisation | Email |
| 1 |  |  |  |
| 2 |  |  |  |

1. **ABSTRACT OF PROPOSAL**

(In no more than 300 words, please provide a concise and accurate description of the proposal that shall include the specific objectives, impact, methodology and approach of the research proposal, including its academic significance and relevant applications to the industries.)

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1. **DETAILS OF RESEARCH PROPOSAL**

(Provide a description of the research in no more than 5 pages using Arial Font 10 with single-line spacing.)

The research proposal should cover the following areas:-

1. Specific Aims / Objectives & Scope

State concisely and realistically what the research described in this application is intended to accomplish and/or what green technology is to be applied/test-bedded.

1. Significance

Briefly describe how this project addresses an important problem. State concisely how the aims of the application will be achieved and the new knowledge created. State concisely how the effects of the concepts and methods used in this project will drive future research in this field. Relevant references, if any, can be provided.

1. Approach

Discuss in detail the conceptual framework, design, methods and analyses in reference to how they are integrated and appropriate to the aims of the project. Discuss potential difficulties, limitations and problem areas in the proposed procedure, and consideration for alternative approach.

1. Originality / Evidence of novel innovation / Targeted TRL

Discuss how the aims of the project are original and innovative. Describe how the project will employ novel concepts, approaches or methods. State concisely how the project challenges existing models, and describe their advantage over existing methodologies or technologies. Targeted Technology Readiness Level (TRL) should also be specified.

1. Investigator (s)

Discuss why the investigators are well-suited to carry out this work, with reference to the experience level of the Principal Investigator, Co-Investigator and other researchers (if any).

1. Relevant & Potential link to the maritime and marine & offshore industry

Discuss how relevant to the industry in which the proposed work will contribute to the probability of success. Discuss how the proposed experiments / testing take advantage of unique features of the Singapore environment or employ useful collaborative arrangements. Include evidence of industrial support for the project, if any. Description regarding usage of industry’s equipment / facility, if any, in the execution of the project, as well as whether there is involvement of staff from the industry or other partners. Industry Collaborators’ contribution towards the project and the benefits from their participation in the project should also be described.

1. References

Please list in chronological order the titles and complete references to recent representative publications pertinent to this research proposal and the applicants’ publications and patents held related to this research proposal. Highlight Scientific Award(s), if any, of the applicant(s). References, if any, such as earlier work in the identified areas can be provided on a separate page in the appendix.

1. **MILESTONES & PROJECT DELIVERABLES**

Milestones

(Please propose milestones to assess the progress of the R&D project. The progress of the project will be taken into consideration for continued disbursements of funds and future renewal of awards. The duration of a typical project should not be longer than 3 years.)

|  |  |  |  |
| --- | --- | --- | --- |
| Milestones | Year 1  (ddmmyy) | Year 2  (ddmmyy) | Year 3  (ddmmyy) |
| 1. |  |  |  |
| 2. |  |  |  |
| 3. |  |  |  |
| 4. |  |  |  |
| 5. |  |  |  |

Project Deliverables

|  |
| --- |
| Targets for research outcomes |
| Year 1  1.  2.  3.  Year 2  1.  2.  3.  Year 3  1.  2.  3. |

Target Capability / Performance Indicators

|  |  |  |
| --- | --- | --- |
|  | **TARGET CAPABILITY / PERFORMANCE INDICATORS** | **ORIGINAL TARGETS (TOTAL)** |
| **Research Manpower Development** | No. of Research Fellows / Post-Doctoral Researchers hired |  |
| No. of Research Associates / Assistants / Engineers hired |  |
| No. of Student Assistants hired |  |
| No. of Ph.D. Students trained |  |
| No. of Master Research Students trained |  |
| No. of Master’s Research and Ph.D. Students spun out |  |
| No. of Undergrad / Polytechnic / J.C. Students attached |  |
|  |  |  |
| **Academic Collaboration** | No. of International Institutes of Higher Learning / Research Institutions in Collaboration |  |
| No. of Local Public Institutes of Higher Learning / Research Institutions in Partnership (Partner Institutions) |  |
|  |  |  |
| **Research & Technology Development** | No. of Technology Disclosures |  |
| No. of Patents Applications filed |  |
| No. of Patents granted |  |
| No. of Technology Transfers |  |
| No. of Journal Papers (e.g. in SCI, EI, Scopus Database) published |  |
| No. of Conference Papers published |  |
| No. of Policy Research publications |  |
| No. of IP Licences to Industry |  |
|  |  |  |
| **Industry Development** | Industry Dollars Received to Fund Project (Cash, S$) |  |
| Industry Dollars Received to Fund Project (In-Kind, S$) |  |
| No. of Industry Partners as Collaborators |  |
| No. of Research Staff spun out |  |

1. **DECLARATION OF OTHER PROJECTS AND FUNDING SOURCES**

(Please provide the details for ALL grants currently held or pending approval by the Principal Investigator [please also update proposals pending approval]. Grants should include those supported by Universities and other funding agencies.)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Grant Title and ID | Funding Agency | Status  (Awarded or Applied) | Amount awarded / applied for ($) | Duration of support (indicate Start & End date) |
|  |  |  |  |  |
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**Note**: Please indicate NIL if there is no entry.

1. **PROJECT ELIGIBILITY**

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| --- | --- |
| Item | Declaration |
| Project activities performed in Singapore?  [*If “NO” or part of research is performed outside of Singapore, please elaborate here*] | **YES / NO** |
| Project Principal Investigator (PI) and Co-Investigator(s) based in Singapore | **YES / NO** |

1. **RESEARCH BUDGET[[1]](#footnote-1)**

(Please prepare the research budget carefully under each category and provide the details and the justifications for all categories in this section. Only the expenses directly related to the proposed project are allowed. It is recommended that the duration of funding is no longer than 3 years.)

Research Grant Requested

All amount stated for Equipment, OOE, and Travel Related Expensesshould include GST, where applicable. Please note that **indirect research cost** **should not be included**.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Year 1  (S$) | Year 2  (S$) | Year 3  (S$) | Total  (S$) |
| Expenditures on Manpower (EOM)\* |  |  |  |  |
| Equipment |  |  |  |  |
| Other Operating Expenditure (OOE) |  |  |  |  |
| Travel Related Expenses |  |  |  |  |
| TOTAL |  |  |  |  |

\*The cost of manpower in EOM shall follow the guidelines or practices of the University / Polytechnic or A\*STAR Research Institute.

|  |  |
| --- | --- |
| **Note**:-  EOM –  Equipment –  OOE –  Overseas Travel – | Scholarship funding for research student/scholar is not supportable.  Workstation/PCs/Computers/Notebooks are generally not supportable under the SMI Funding guidelines. Please consider leasing/rental options.  Local transport costs are generally not supportable.  Do not exceed $6,000 per person per trip and do not exceed $12,000 per year for total travel expenses. |

Justifications

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| --- |
| Justifications for the EOM |
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| --- |
| Justifications for the Equipment |
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|  |
| --- |
| Justifications for the OOE – Materials & Consumables |
|  |

|  |
| --- |
| Justifications for the OOE –Travel Related Expenses |
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|  |
| --- |
| Industry Cash & In-kind contributions, if any (please provide the details) |
|  |

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| --- |
| IHL/RI’s Cash & In-kind contributions, if any (please provide the details) |
|  |

\**IHL/RI’s cash and in-kind contribution should only be specified in this segment. Please* *do not include your IHL/RI’s cash and in-kind contribution within the research budget table above.*

1. **UNDERTAKING BY PRINCIPAL INVESTIGATOR AND ALL CO-INVESTIGATORS/COLLABORATORS**

|  |  |
| --- | --- |
| In signing this Grant Application, the Principal Investigator and all Co-Investigator(s) shall UNDERTAKE (on any Grant Award):   * Not to send similar versions or part(s) of this proposal to other agencies for funding; * Ensure that the SMI Fund is acknowledged in all publications; * Ensure that all publications arising from research wholly or partially funded by SMI will be forwarded to SMI for approval; * Obtain approval from SMI and/or relevant University/Polytechnic and/or A\*STAR Research Institute before engaging in any commercial activity that will exploit the findings of the research funded under the SMI R&D Programme; * To sign a confidentiality agreement prior to any discussions with industries, if applicable. | |
| -----------------------------------------------------------  Signature of IHL/A\*STAR RI Principal Investigator  Name:  Date: |  |
| -----------------------------------------------------------  Signature of IHL/A\*STAR RI Co- Investigator  Name:  Date: | -----------------------------------------------------------  Signature of Industry/Academia Collaborator  Name:  Date: |
| -----------------------------------------------------------  Signature of IHL/A\*STAR RI Co- Investigator  Name:  Date: | -----------------------------------------------------------  Signature of Industry/Academia Collaborator  Name:  Date: |
| -----------------------------------------------------------  Signature of IHL/A\*STAR RI Co- Investigator  Name:  Date: | -----------------------------------------------------------  Signature of Industry/Academia Collaborator  Name:  Date: |

1. **OVERALL EVALUATION / UNDERTAKING BY EVALUATORS**

|  |  |
| --- | --- |
| Based on the above given evaluations, the Executive Directors of the respective MI@IHLs or A\*STAR Research Institute**[[2]](#footnote-2)**(if applicable), in consultation with the head of faculty/school/department of the respective MI@IHLs or A\*STAR Research Institute, and taking into account the number of R&D projects which the Principal Investigator currently has on hand, hereby decide that the proposed project is:  **SUPPORTED / NOT SUPPORTED**  In signing the Grant Application, the ED of MI@IHLs or A\*STAR RIs (if applicable) UNDERTAKE, on any Grant Award, to:   * Provide appropriate support during the grant period; * Ensure that the project eligibility criteria has been fulfilled[[3]](#footnote-3); * Ensure that the funds provided are used for the appropriate purposes; * Ensure that approval from SMI has been obtained before engaging in any commercial activity that will exploit the findings of the research funded under the SMI MSA R&D Programme; and * Support and agree to this proposal being carried out in the respective MI@IHL or A\*STAR RIs (where appropriate). | |
| Signature of  Head of Faculty / School / Department  Name:  Date:  Department: | Signature of  ED of MI@IHLs or ED of A\*STAR RI  Name:  Date:  Organisation: |

**[FOR OFFICE USE ONLY]**

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| --- | --- | --- | --- |
| **Project Eligibility** | | | |
| ***Criteria*** | ***Assessment*** | ***Verification Opinion by***  (if assessment of proposal as ineligible) | ***Second Verification Opinion by***  (if assessment and verification opinion conflicts) |
| **Project activities performed in Singapore** | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* |
| **Project beneficial to Singapore’s maritime & offshore industry**  **(Expected R&D outcomes, Capability building)** | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* |
| **Project with clear outcomes, milestones, budget, measurable KPIs, and innovation** | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* |
| **Project Principal Investigator (PI) and Co-Investigator(s) based in Singapore** | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* |
| **Projects not already funded by other Govt. Agencies** | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* | ***✓ / 🗶***  *(Comments Here)* |
| **FOR THE PURPOSE OF FURTHER EVALUATION, THE PROPOSAL SATISFIES THE BASE CRITERIA AND IS ASSESSED AS** | ***ELIGIBLE / INELIGIBLE*** | ***ELIGIBLE / INELIGIBLE*** | ***ELIGIBLE / INELIGIBLE*** |
|  | (Name & Date) | (Name & Date) | (Name & Date) |

**\***The above to be verified and completed by the respective MI@IHLs for NUS, NTU, SP and NP applications.

1. Provide itemised breakdowns, costs and justifications for each category in the Research Budget. [↑](#footnote-ref-1)
2. For A\*STAR RIs, please seek clearance from the Science and Engineering Research Council (SERC) before submitting the proposal to SMI. [↑](#footnote-ref-2)
3. Project eligibility will be verified and performed by the respective MI@IHLs. [↑](#footnote-ref-3)