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Circular to Professional Institutes / Associations

Dear Sir / Madam,

MINISTRY OF NATIONAL DEVELOPMENT RESEARCH FUNDING (MNDRF) REQUEST FOR PROPOSALS ON DEVELOPMENT OF TECHNOLOGIES FOR DETECTION OF WATER SEEPAGE IN RESIDENTIAL BUILDINGS

1. OBJECTIVE

- 1.1 The MND Research Fund (MNDRF) funded by Ministry of National Development launched the MNDRF Grant Call for the development of technologies to detect water seepage in residential buildings.

2. BACKGROUND

- 2.1 The current challenges faced by the BCA's Quality & Certification Department (QCD) CONQUAS¹ assessor is the restricted and limited accessibility to inspect any potential water seepage in enclosed spaces. In particular, for private residential buildings where false panels are used to hide the plumbing and sanitary piping, the conduct of wet area water tightness test becomes less comprehensive due to the access constraints.
- 2.2 While the shift towards Pre-fabricated Pre-finished Volumetric Construction (PPVC) and Pre-fabricated Bathroom Unit (PBU) in construction had enhanced the built quality and water-tightness in such building elements, the objective evaluation of their water-tightness integrity during fabrication at off-site yard, after on-site assembly and during building operation is also critical.
- 2.3 The MNDRF funding was made available by MND to meet the needs of finding useful innovation and technology solutions to enhance BCA's QCD CONQUAS assessment for detection of wet area water seepage under the architectural component of CONQUAS.

¹ CONQUAS – Construction Quality Assessment System

3. SCOPE OF GRANT CALL

3.1 The key focus area of this grant call is to develop technologies that are able to assist the CONQUAS assessor to overcome the limited accessibility posed by architectural panels and fitments for an effective inspection for any potential or existing water seepage at the enclosed ceiling/walls and wall joint.

3.2 The targeted developed technology has to meet the following requirements from the CONQUAS Assessor's perspectives through;

- a) Customization of inspection technology (handheld or autonomous) by leveraging on existing technology with the **capability and suitability** to aid access and inspection of water seepage.
- b) Image or sensing data captured by the *developed* inspection technology require further data analysis to effectively identify the water seepage point or area.
- c) Visualization and mapping tool supported by sensing data must be able to demonstrate to the assessor the extent of the water seepage identified and pinpoint the likely building element(s) that caused them.
- d) A developed platform to store those historical assessment data from every CONQUAS assessment with the convenience of data accessibility by the assessor using the smartphone/tablet.
- e) Technology developer has to ensure a viable developing cost for the proposed inspection technology with the view that such a technology would be used by industry practitioners for both inspection and assessment.

3.3.1 One of the two technology we are targeting but not limited to are,

a) Develop an autonomous robot that is both lightweight and miniature that has the capability to self-manuever and overcome possible obstacle around the targeted inspection area. The robot has to be equipped with inspection tools such as thermal camera and camera to scan the ceiling or vertical surface. A software platform with image analytical tool will be developed to store and analyze the transferred scanned image data to pinpoint possible water seepage point or area either for inter-floor leakage or leakage from external to inner wall. The CONQUAS Assessors will be able to access the information from their handheld tablet/device to inform the contractor of the inspection result.

or

b) Develop an ergonomic handheld tool that is lightweight with extendable flexible rod, equipped with inspection tool such as thermal camera and camera, miniature enough to manually scan the ceiling or vertical wall for any possible water seepage point or area by the CONQUAS assessor. A software platform with image analytical tool will be developed to store and analyze the transfer scanned image data to pinpoint possible water seepage point or area caused by inter-floor leakage or leakage from external to inner wall. The

CONQUAS Assessors will be able to access the information from their handheld tablet/device to inform the contractor of the inspection result.

4. ELIGIBILITY

- 4.1 This call is open to Institutes of Higher Learning (IHLs), Research Institutes, private sector companies and not-for-profit organization.
- 4.2 Project shall involve researchers from academic or research organisations to collaborate with at least one relevant industry partners or government agency.
- 4.3 The project should use Singapore as a base to own, manage and exploit all intellectual property right developed.
- 4.4 Project must not have commenced at the time of application.

5. FUNDING SUPPORT

- 5.1 IHLs, research institutes and not-for-profit organisations would qualify for up to 100% funding support of approved direct qualifying costs of a project. Only IHLs and not-for-profit entities would be allowed support for indirect costs. These include up to 20% of qualifying costs for overhead costs.
- 5.2 Private sector companies would qualify for up to 70% of funding support of the approved direct qualifying costs of a project.
- 5.3 Proposals should not be funded or be currently considered for funding by other agencies.
- 5.4 Funding awarded cannot be used to support overseas R&D activities. All funding awarded must be used to carry out the research activities in Singapore unless approved in the grant.
- 5.5 There is no cap per project but PIs are requested to propose reasonable budget vis-à-vis the scope of the work and over budgeting is highly discouraged. Project duration should **not be more than 18 months**.

6. SUBMISSION

- 6.1 All applicants have to submit the proposal using the attached proposal template.
- 6.2 All applicants must send in **2 hard copies and 1 electronic copy** of duly signed proposals by **07 March 2016, 1700hrs Singapore time (GMT +08:00)** to the following:

MND Research Fund Secretariat
c/o Building and Construction Authority
R&D Programmes Department
200 Braddell Road
ZEB Level 3
Singapore 579700

7. EVALUATION PROCESS

- 7.1 All proposals received by the MND Research Fund Secretariat will be submitted to the Technical Evaluation Panel (TEP) for evaluation. The TEP which comprise representatives from public agencies and industry will evaluate and recommend (to award or decline) each proposal. The recommendations of the TEP will then be forwarded to MND for final approval.

8. RESULTS

- 8.1 Successful proposals which are accepted and approved by MND will be notified by **Q2 2016**.

9. INFORMATION

- 9.1 The full details of the scheme and application form can be separately obtained through the below contact,

Mr Tan Lian Huat at Tan_Lian_Huat@bca.gov.sg

Mr Desmond Ang at desmond_ang@bca.gov.sg

Thank you.



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