

MP Corrosion Innovation of the Year Awards Nomination Form for 2021

Additional Nominee's Name:

Job Title:

Organization:

Mailing Address:

City: State: ZIP/Postal Code: Country:

Telephone:

(If outside the United States and Canada, please include country code)

E-mail:

Is this the primary contact for the Award program? Yes No

Additional Nominee's Name:

Job Title:

Organization:

Mailing Address:

City: State: ZIP/Postal Code: Country:

Telephone:

(If outside the United States and Canada, please include country code)

E-mail:

Is this the primary contact for the Award program? Yes No

NOTE: The above contact information will not be made public except the nominees' names, job titles, and organizations. However, all information submitted on the following pages will be submitted to the panel of corrosion experts and posted on the MP Corrosion Innovation of the Year Awards web site.

2021 Award Nomination

Title of Innovation:

(insert title here—no more than five words)

Nominee(s):

(insert Name[s] and Organization[s])

Web site:

Summary Description:

CorrosionRADAR (CR), a spin-out of Cranfield University UK, is pioneering a novel predictive corrosion monitoring (US patent granted) which is especially suited to the problem of early indication of locations of hidden corrosion such as Corrosion Under Insulation (CUI).

Predictive CUI monitoring using Electro-Magnetic Guided Radar (EMGR) is a promising new technique for managing CUI in

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Full Description

(Please provide complete answers to the questions below. Graphs, charts, and photos can be inserted to support the answers.)

1. What is the innovation?

The innovative and novel predictive CUI monitoring system is based on a sensor mounted on the external surface of pipes and vessels. The key technical technology behind the new high-resolution monitoring system from CorrosionRADAR is the Electro-Magnetic Guided Radar (EMGR). This new monitoring system is suitable for wide range of structures and applications, including on large surfaces (such as process vessels and tanks) and complex geometries (e.g. valves and flanges),

2. How does the innovation work?

The working principle of the predictive CUI sensor (both corrosion and moisture sensor) is based on Electro-Magnetic Guided Radar (EMGR), which was invented at Cranfield University in the United Kingdom. This patented sensing system is in the form of a long thin flexible waveguide placed in close proximity to the external surface of the asset and permanently embedded in the insulation. A long-range distributed corrosion sensor acts as a thin flexible waveguide line with the external layer of the

3. Describe the corrosion problem or technological gap that sparked the development of the innovation. How does the innovation improve upon existing methods/technologies to address this corrosion problem or provide a new solution to bridge the technology gap?

Corrosion has been an inherent problem for structures, machines, and equipment since the industrial revolution. The problem is more challenging in the hidden and difficult to access areas, for example in the case of thermally insulated and buried pipes, where corrosion on the outer surface of the pipes remains undetected due to the surrounding insulation - commonly known as Corrosion Under Insulation (CUI)

4. Has the innovation been tested in the laboratory or in the field? If so, please describe any tests or field demonstrations and the results that support the capability and feasibility of the innovation.

Since 2014, R&D was being performed in Cranfield University UK, and the spin-out company established in April 2017 for further R&D, product development and commercialisation.

The system have undergone extensive accelerated testing in laboratory in Cranfield University UK, Robert Gordon Univeristy UK and University of Strathclyde UK.

5. How can the innovation be incorporated into existing corrosion prevention and control activities and how does it benefit the industry/industries it serves (i.e., does it provide a cost and/or time savings; improve an inspection, testing, or data collection process; help to extend the service life of assets or corrosion-control systems, etc.)?

The corrosion and moisture sensors are installed under the insulation, adjacent to the external wall of pipes or process vessels. A single line sensor can provide spatially continuous coverage of a complex pipe network (hundreds of metres in length) from a single location and can locate corrosion with an accuracy of a few centimetres. Their range and sensitivity are not affected by the condition or geometry of the pipe, and large surfaces such as vessels and tanks can be covered by installing the line

6. Is the innovation commercially available? If yes, how long has it been utilized? If not, what is the next step in making the innovation commercially available? What are the challenges, if any, that may affect further development or use of this innovation and how could they be overcome?

Since the incorporation of the CorrosionRADAR company in April 2017, fifteen systems have been deployed for field pilots in chemical plants in Europe and India by the end of 2020 The following technical milestones have been achieved:

- **Development of the functional product of the CorrosionRADAR system which has undergone extensive laboratory and field testing.**

7. Are there any patents related to this work? If yes, please provide the patent title, number, and inventor.

**Patent Title – Corrosion Monitoring System,
Patent Number - US20190064096A1, filed 26.1.17
Inventors – Dr Prafull Sharma, Prof Hoi Yeung**