

# Request for Proposal RFP\_2019\_0111: Cost-Effective Installation of Small Sensors on Insulated Pipes

<b>RFP Title</b>	Cost-Effective Installation of Small Sensors on Insulated Pipes
<b>Due Date</b>	08/16/2019
<b>Opportunity</b>	Product acquisition, licensing, supplier agreement, proof of concept leading to scale-up to manufacturing.
<b>Timeline</b>	Phase 1 – proposal evaluation (1 month) Phase 2 – method testing (Q4 2019) Phase 3 – commercial application (mid 2020)
<b>Financials</b>	Phase 1: the proposals selected for phase 2 will be awarded with 5,000€ Phase 2: costs related to the trials are to be discussed
<b>RFP Description</b>	NineSigma, representing <b>Equinor ASA</b> , invites proposals for a method that permits the cost-effective installation of small sensors at the bottom (at 6 o'clock) of insulated pipes on an industrial scale (thousands of sensors). To install the sensor, a 16 mm wide hole needs to be made through a 0.6 mm thick stainless steel jacket. The purpose of the call is to find an innovative and cost-effective alternative to manual installations that use scaffolding.
<b>Background</b>	<p>Equinor wishes to install small, wireless sensors at regular intervals on insulated pipes. Most of the pipes are not easily accessible (e.g. suspended at heights and often with limited free space around them). The standard way to work on these pipes is by erecting a scaffold to allow access for a work crew. Scaffolding is not only work-hour intensive but also expensive, and carries a safety hazard when installing, using and removing. Since there are several hundred kilometers of pipes, installation of the sensors can be very slow and costly. Therefore, Equinor would like to learn if there are methods that can significantly reduce installation costs (e.g. at least 50% fewer work-hours compared to scaffolding).</p> <p><u>Anticipated Project Phases or Project Plan</u></p> <p>Phase 1 – Proposal Evaluation</p> <ul style="list-style-type: none"><li>• Equinor will evaluate the proposals using the information submitted in the response template</li><li>• Up to 10 promising proposals will be contacted for a more in-depth discussion</li><li>• Up to 5 proposals will be selected for participation to the field trial</li></ul> <p>Phase 2 – Method Testing</p> <ul style="list-style-type: none"><li>• Field trial at a client specified location</li><li>• Demonstration of the method, including the setting up and dismantling procedure (if applicable)</li><li>• Trial will be to install and anchor 20 sensors over a 10 meter long pipe section (see Annex 1)</li><li>• Initial evaluation of method costs</li></ul> <p>Phase 3 – Commercial Application</p> <ul style="list-style-type: none"><li>• Further optimization of operating parameters and performance before going to large scale use</li></ul>
<b>Key Success Criteria</b>	Equinor invites proposals with the following properties: Creation Time: 07/08/2019 07:59 AM

**Performance for the field trial:**

- Allow access to and be able to do work on a section of insulated pipe. The pipe outer diameter will be 320 mm. The pipe will be at 2.5 meter height. See Annex 1 – Schematic Pipe Section for the Trial
- Work will be to make a 16 mm hole at the bottom (at 6 o'clock) of the pipe and subsequently anchor a sensor (see Annex 2 for sensor dimensions). Cladding must not be damaged during installation.
- Must not pose 'Health, Safety and Environmental' hazards to site or operators
- Reduce work-hours to reduce cost and exposure

**'Nice to have's':**

- Able to operate with a small mechanical footprint around the pipe. Free space around the pipes can be less than 1 meter, sometimes only 100 mm being available.
- Able to operate on bent pipes or complex sections of pipes
- Compliance to explosive atmosphere

**Financials/business targets:**

- Allowing a significant (e.g. > 50%) labor reduction for accessing pipes and installing sensors. The work-hours for installing a scaffold around the 10 meter pipe section used for the test, performing the sensor installation work and removing the scaffold is estimated to be 30 work-hours. The target is to do the work within 15 work-hours.

**Technology readiness:**

- Preferred solutions should be ready for the trial by end of 2019 (or 3 months after selection by Equinor)

**Notes:**

- A single all encompassing solution may not be available. Proposals from organizations believing they have part of the solution are encouraged to participate and should describe how they would fit into an overall solution and if possible point to other sources for any missing elements. The partial solution should be testable.
- Equinor will not provide manufacturing or integration facilities. All work is expected to be provided by third parties.
- Equinor does not expect exclusivity. Successful participants have the potential to offer their technology to other customers in order to increase scale and economies.

**Area of Interest**

Environmental Sciences > Oil, Gas, and Energy  
Engineering-Civil > Construction Engineering  
Engineering-Mechanical > Mechanical Engineering-General  
Engineering-Electrical > Electrical and Electronics > Robotics

**Possible Approaches**

Full or partial solutions are welcome from all industries and scientific areas. Possible approaches might include, but are not limited to:

- Robotics based solutions, e.g. crawling around the pipe
- Drones accessing the pipes and able to make a hole before placing the sensor
- Lightweight, easy to erect and dismantle scaffolding
- Any approaches that require minimal manual intervention

**Approaches not of Interest**

The following approaches are not of interest:

- Standard scaffolding approaches relying on low-cost labor
- Use of standard cherry pickers, trucks with basket, scissor lifts
- Proposals based on rope access since these will create even more safety risks

- Research proposals that might deliver against the requirements at some indefinable future point

**Preferred Collaboration Types** Joint Development  
Supply Agreement  
Technology Acquisition  
Technology Licensing

**Items to be Submitted** Your response should address the following:

- Non-Confidential description of technology, method or equipment
- Working principle
- Supporting data
- Technology maturity (lab-scale tested, pilot scale tested, suitable for practical use)
- Estimated development requirements for possible participation in the field trial including timing and budget
- Estimated operating costs when in commercial use
- Preferred business relationship
- Intellectual property status
- Short overview of team behind the proposal and expertise in this or related fields

Appropriate responses to this Request

Responses from companies (small to large), researchers, consultants, venture capitalists, entrepreneurs, or inventors are welcome. For example:

You represent a **company** that has developed novel robotic tools suitable for this request





You represent an **engineering company** that has a suitable procedure for sensors deployment

You represent an **inventor** who designed a novel drone system able to do drilling work

You represent an **academic researcher** working on a humanoid robot that should be suitable

**Award Amount**

**Attachments**

	Name	Creation Time	Size	Created By
	ANNEX 1 – SCHEMATIC OF PI...	05/27/2019 08:31 AM	387.79 kB	Jos Cenens
	Annex 3 - 3D CAD model te...	05/29/2019 05:47 AM	286.71 MB	Jos Cenens
	ANNEX 2 - PHYSICAL SPECIF...	06/05/2019 11:53 AM	84.62 kB	Jos Cenens
	Annex 4 Questions and Ans...	07/08/2019 07:58 AM	133.03 kB	Jos Cenens

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**Picture**

