

NIA Project Registration and PEA Document

Date of Submission

Jul 2018

Project Reference Number

NIA_CAD0023

Project Registration

Project Title

Smart Tester – MP applications

Project Reference Number

NIA_CAD0023

Project Licensee(s)

Cadent

Project Start

July 2018

Project Duration

1 year and 4 months

Nominated Project Contact(s)

Cadent Innovation Team

Project Budget

£160,145.00

Summary

This project will build on the previous NIA project collaboration between WWU and SVI that produced the LP service version of this system and process. Various technical, hardware and software alterations are required to support the increased pressure range of the equipment and the consequent increase in tolerances and accuracy required, these alterations and developed technology will then be used to demonstrate that test times can safely be reduced.

Nominated Contact Email Address(es)

Innovation@cadentgas.com

Problem Being Solved

Where gas mains are newly connected to the network, replaced or diverted they are required to be tested to ensure their integrity and leak tightness. This test takes the form of a pressurised air test to demonstrate, to within a permissible pressure drop, gas industry standard compliance.

Existing methodologies involve application of mathematical calculations and interpretation of complex data which can result in incorrect test durations being applied and allowable pressure loss tolerances being incorrectly applied.

Method(s)

This project will build on the previous NIA project collaboration between WWU and SVI that produced the LP service version of this system and process. Various technical, hardware and software alterations are required to support the increased pressure range of the equipment and the consequent increase in tolerances and accuracy required, these alterations and developed technology will then be used to demonstrate that test times can safely be reduced.

Scope

The project is split into the following 4 stages and applies to MP mains and services, designed to work with both IOS and Android operating systems.

Stage 1:

- Research and development activities will include a thorough investigation into the fundamental principles of the existing calculators
- Site visits to gain a better understanding of the documents and procedures used by engineers.
- Mechanical testing and quality assurance of the various pressure transducers available to the project.
- Development of 32-bit firmware to enable high resolution data transmission.
- Commercial viability and manufacturability assessment.

Stage 2:

- Proof of concept, semi-automated calculators with limited error handling.
- Stability testing of instrumentation including barometric sensor under low power conditions
- Initial user interface design and prototyping, building on existing SMARTester platform.
- Feature development, enhancing the core technology.
- Laboratory testing of instrument and associated long duration systems.
- Iteration and testing of key improvements in simulated conditions

Stage 3:

- Server-side stress testing to ensure record keeping and data structure is stable and scalable.
- Field trial to measure benefit.
- Validate user interface and procedural flow.
- Iteration and testing of key improvements in the field.

Stage 4:

- iOS validation.
- API design for interconnectivity.

• Each stage culminates in a design review with the relevant stakeholders. A project report being produced detailing the learning, opportunities and risks will be delivered to Cadent. Before proceeding with any subsequent work, authority is sought and any changes that arise through planning or risk mitigation are reviewed.

- Production of a formal report at the end of each stage.
- 5 x operational SMARTester prototype units

Objective(s)

The aim of the project is to significantly and safely reduce test time of MP mains pre-commissioning tests to the safest lower limit and by building and testing a smart pressure sensing device, which will be used in conjunction with existing standard compressor units and the current testing methodology. The development will also update the associated back office system from the previous WWU project that will allow accurate measurement, display, reporting, storage and relevant sharing of medium pressure mains tests data across initially the Cadent gas distribution network.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Successful development and approval of software and hardware to fulfil objective within time and budget.

Project Partners and External Funding

Cadent Gas Ltd – 100% NIA Funding

- Steve Vick International Ltd - £112,200
- Internal Costs - £37,400
- Total:£149,600

Potential for New Learning

This project is an extension of the LP Smart Tester and plans to extend that learning and experience into MP testing as discussed. There is potential to further extend into higher pressure tiers and due to the nature of the management system inherent in the solution it will further inform future opportunities and direction with regard to cradle to grave smart records based asset management approaches.

Scale of Project

A key part of this project is building and robustly testing a viable system which will build stakeholder confidence.

Technology Readiness at Start

TRL2 Invention and Research

Technology Readiness at End

TRL6 Large Scale

Geographical Area

The project will be delivered from the Steve Vick facilities and be operable across the Cadent networks.

Revenue Allowed for the RIIO Settlement

No revenue allowed for in the RIIO settlement.

Indicative Total NIA Project Expenditure

£149,600

Project Eligibility Assessment Part 1

There are slightly differing requirements for RIIO-1 and RIIO-2 NIA projects. This is noted in each case, with the requirement numbers listed for both where they differ (shown as RIIO-2 / RIIO-1).

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations (Please complete sections 3.1.1 and 3.1.2 for RIIO-2 projects only)

Please answer **at least one** of the following:

How the Project has the potential to facilitate the energy system transition:

n/a

How the Project has potential to benefit consumer in vulnerable situations:

n/a

Requirement 2 / 2b

Has the potential to deliver net benefits to consumers

Project must have the potential to deliver a Solution that delivers a net benefit to consumers of the Gas Transporter and/or Electricity Transmission or Electricity Distribution licensee, as the context requires. This could include delivering a Solution at a lower cost than the most efficient Method currently in use on the GB Gas Transportation System, the Gas Transporter's and/or Electricity Transmission or Electricity Distribution licensee's network, or wider benefits, such as social or environmental.

Please provide an estimate of the saving if the Problem is solved (RIIO-1 projects only)

Benefits set against MP test only. Potential for LP/IP.

Benefits accrued from less time on site – visits to >24hr tests, reduced operational time on site (33%), writing NRO's, like for like equipment costs. Reviewed at Engineering Forum 25th May 2018.

Not including benefits from reduced occupation of the highway and all associated costs e.g. Lane Rental, Traffic Management, Complaints and Stakeholder engagement.

Not monetised benefits from consistent application of policy and test audit trail.

Please provide a calculation of the expected benefits the Solution

Costs attributable to less time on site as a result reduced test times, reduction in annual expenditure on equipment and reduced effort in NRO writing it is estimated that Cadent costs can be reduced by approximately £171kpa.

Please provide an estimate of how replicable the Method is across GB

Applicable to all gas network licensees.

Please provide an outline of the costs of rolling out the Method across GB.

Subscription to the service provided on a per unit basis.

Requirement 3 / 1

Involve Research, Development or Demonstration

A RIIO-1 NIA Project must have the potential to have a Direct Impact on a Network Licensee's network or the operations of the System Operator and involve the Research, Development, or Demonstration of at least one of the following (please tick which applies):

- ☒ A specific piece of new (i.e. unproven in GB, or where a method has been trialled outside GB the Network Licensee must justify repeating it as part of a project) equipment (including control and communications system software).
- ☐ A specific novel arrangement or application of existing licensee equipment (including control and/or communications systems and/or software)
- ☐ A specific novel operational practice directly related to the operation of the Network Licensees system
- ☐ A specific novel commercial arrangement

RIO-2 Projects

- ☐ A specific piece of new equipment (including monitoring, control and communications systems and software)
- ☐ A specific piece of new technology (including analysis and modelling systems or software), in relation to which the Method is unproven
- ☐ A new methodology (including the identification of specific new procedures or techniques used to identify, select, process, and analyse information)
- ☐ A specific novel arrangement or application of existing gas transportation, electricity transmission or electricity distribution equipment, technology or methodology
- ☐ A specific novel operational practice directly related to the operation of the GB Gas Transportation System, electricity transmission or electricity distribution
- ☐ A specific novel commercial arrangement

Specific Requirements 4 / 2a

Please explain how the learning that will be generated could be used by the relevant Network Licensees

The management system, process and hardware can be adopted by other GDN's.

Or, please describe what specific challenge identified in the Network Licensee's innovation strategy that is being addressed by the project (RIO-1 only)

This project supports Cadent Gas' drive to serve our customers efficiently and effectively.

- ☒ Has the Potential to Develop Learning That Can be Applied by all Relevant Network Licensees

Is the default IPR position being applied?

- ☒ Yes

Project Eligibility Assessment Part 2

Not lead to unnecessary duplication

A Project must not lead to unnecessary duplication of any other Project, including but not limited to IFI, LCNE, NIA, NIC or SIF projects already registered, being carried out or completed.

Please demonstrate below that no unnecessary duplication will occur as a result of the Project.

Extension of previous project.

If applicable, justify why you are undertaking a Project similar to those being carried out by any other Network Licensees.

n/a

Additional Governance And Document Upload

Please identify why the project is innovative and has not been tried before

The project is innovative as a further development of a previous NIA funded innovation project.

Relevant Foreground IPR

n/a

Data Access Details

n/a

Please identify why the Network Licensees will not fund the project as apart of it's business and usual activities

Although the potential for cost saving has been demonstrated there is still a high degree of risk associated with the project and, as such, Cadent Gas is unable to fund the project as part of its business as usual activities.

Please identify why the project can only be undertaken with the support of the NIA, including reference to the specific risks(e.g. commercial, technical, operational or regulatory) associated with the project

As stated above, there is a high degree of risk associated with the project which prevents Cadent from funding it as part of its business as usual activities. Some of these key risks are: • Software and associated data may not deliver the required (and expected) level of accuracy consistently to give confidence that traditional methods can be replaced. • Software/hardware limitations. Mitigations plans will be put in place to manage these risks as the project progresses.

This project has been approved by a senior member of staff

☒ Yes