

Notes on Completion: Please refer to the appropriate NIA Governance Document to assist in the completion of this form. The full completed submission should not exceed 6 pages in total.

NIA Project Registration and PEA Document

Date of Submission

Nov 2015

Project Reference Number

NIA_WPD_007

Project Registration

Project Title

Airborne Inspection Phase 1

Project Reference Number

NIA_WPD_007

Project Licensee(s)

National Grid Electricity Distribution

Project Start

November 2015

Project Duration

2 years and 1 month

Nominated Project Contact(s)

James Bennett – WPD Innovation & Low Carbon Engineer

Project Budget

£530,000.00

Summary

Distribution Network Operators have statutory duties under the Electricity Safety Quality and Continuity Regulations 2002 to maintain its system in a safe condition and to undertake an assessment of the risk of unauthorised access, interference or vandalism. Regular inspection and subsequent condition based maintenance also reduces customer interruptions. By improving the existing helicopter based inspection regime cost savings in a number of areas can be achieved together with an improvement in network performance.

The overarching aim of the project is to produce a helicopter based system which can automatically assess line condition and produce reports on any issues for the end user in an appropriate form. In order to achieve this, the existing sensing capabilities need to be assessed and recommendations for improvements made, the new sensing system shall be integrated with existing asset databases and a condition monitoring system developed.

It is anticipated that the sensing capabilities shall be limited to commercially available cameras but the subsequent developed system shall be scalable to include future hardware such as LIDAR and RF PD

It is not anticipated that the system shall replace the observers' role within the inspection regime but rather will become the observers' tool for inspecting.

Problem Being Solved

Currently helicopter based overhead electricity line inspections rely on the observer visually (Either directly or through cameras) assessing the line and documenting their findings with any significant issues relayed back to the local maintenance team for rectification on return to base.

Whilst historically tried and tested the availability of much improved sensors together with image recognition and wider system integration (Asset records, GIS, GPS etc.) means that there is now scope for a much more efficient inspection style over a greater length of network resulting in cost savings and improved network reliability.

Method(s)

The project shall consist of six distinct aspects;

- 1) Identify key user requirements for a helicopter mounted sensing system which will be used to inform a tender document in order to specify a camera system. Further work under Phase 2 of the project shall procure and integrate a LIDAR system.
- 2) Integrate existing asset management information in to the sensing system
- 3) Develop 'in air' reporting capabilities to allow timely data transfer to interested parties
- 4) Develop a semi-automated condition report generating function
- 5) Develop automatic tracking capabilities for overhead lines
- 6) Develop image recognition capabilities in order to automatically identify ESQCR non-compliance together with other asset condition issues

Scope

Distribution Network Operators have statutory duties under the Electricity Safety Quality and Continuity Regulations 2002 to maintain its system in a safe condition and to undertake an assessment of the risk of unauthorised access, interference or vandalism. Regular inspection and subsequent condition based maintenance also reduces customer interruptions. By improving the existing helicopter based inspection regime cost savings in a number of areas can be achieved together with an improvement in network performance.

The overarching aim of the project is to produce a helicopter based system which can automatically assess line condition and produce reports on any issues for the end user in an appropriate form. In order to achieve this, the existing sensing capabilities need to be assessed and recommendations for improvements made, the new sensing system shall be integrated with existing asset databases and a condition monitoring system developed.

It is anticipated that the sensing capabilities shall be limited to commercially available cameras but the subsequent developed system shall be scalable to include future hardware such as LIDAR and RF PD

It is not anticipated that the system shall replace the observers' role within the inspection regime but rather will become the observers' tool for inspecting.

Objective(s)

- 1) Identify the optimum helicopter mounted sensing system which will enable long range data acquisition in the most operator friendly manner. The system should be able to present data in a format which can be integrated with other technologies and also used within analysis software
- 2) Produce a data analysis package capable of autonomously gathering data in order to identify faults and deterioration. The package should integrate with existing asset records and GIS data to produce reports and record inspection against existing records.
- 3) Produce a system capable of the real-time reporting of condition back to interested parties on the ground

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

- 1) Production of a firm recommendation for the helicopter mounted sensor setup
- 2) Successful integration of existing asset information with camera data
- 3) Development of 'in air' data transfer
- 4) The accurate identification of a number of asset conditions using data analysis software

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

The project size is kept at the smallest that is practical. We will focus on equipping one helicopter with the necessary hardware which can then be replicated if successful as business as usual. Any reduction in scale would not produce results of the required quality.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

It is anticipated that the project will take place across all four of the WPD licence areas (South West, South Wales, West Midlands & East Midlands).

Revenue Allowed for the RIIO Settlement

Nil

Indicative Total NIA Project Expenditure

£477,000

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)

It is estimated that the project could provide a saving of £2.25million per year across the company through a reduction in foot patrols, increased speed in helicopter patrol and increased accuracy in fault identification. The project will also ensure a reduction in CIs and CMLs.

Please provide a calculation of the expected benefits the Solution

Base Cost £1.40Million – Method Cost £1.05Million = £0.35Million per year

The reduction in business costs associated with foot patrols & faults can also be added to give an overall benefit of £2.25million per year.

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

The method is easily replicable across the whole of the GB network licensees

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

It is anticipated that there will be negligible roll-out costs associated with the new technology. As the majority of DNOs use contractors it is anticipated that the investment will be made by them. This increase in hardware cost will be offset by the increased efficiency resulting in a lower cost per km inspected for the DNO.

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

RIIO-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

As all UK electricity DNOs use helicopter patrols in some way the learning gained from this project would allow for more efficient working practices to be adopted across the country.

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

n/a

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, LCNF, 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.

n/a

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

n/a

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

n/a

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

n/a

This project has been approved by a senior member of staff

Yes