national gas transmission

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

Mar 2016

Project Reference Number

NIA_NGGT0089

Project Registration

Project Title

Asset Information Models (AIM) for Component/Pattern Recognition

Project Reference Number

NIA_NGGT0089

Project Licensee(s)

National Gas Transmission PLC

Project Start

March 2016

Project Duration

1 year and 1 month

Nominated Project Contact(s)

Martin Cahill, box.GT.innovation@nationalgrid.com

Project Budget

£662,000.00

Summary

Following on from the BIM project, it was identified the 3D modelling created for the design of projects could incorporate automation, allowing for the accurate creation of up-to-date models of sites. Where BIM was used in design phase, this project incorporates non-BIM assets to model retrospectively. It is estimated this has the potential to be 25-50% more efficient than the current process for creating records for sites. A consistent interface is to be created, where asset records are captured, centrally updated, and interrogated by the asset owner/operator. Too often repeat site visits are required to capture individual data records; this proposal will reduce the abortive time to undertake this manual activity.

Preceding Projects

NIA_NGGT0024 - BIM (Building Information Modelling)

Third Party Collaborators

Premtech Ltd

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

National Grid asset records traditionally exist in a 2D electronic or hard copy format, and are dependent upon continuous transfer of asset data to remain accurate, involving time spent both searching and updating the records. This is required to capture changes from activities such as maintenance, asset modification, and asset replacement, and is a manual process than can be inefficient as well as often inaccurate. The aim is to address these issues to reach a method that is accurate and efficient for updating records.

Method(s)

The Project aims to establish a methodology for efficiently creating asset records in a 3D model format using a laser scan, and transferring the data from the project model to form an asset information model (AIM). This builds on the previous BIM (Building Information Modelling) project. Deliverables for the project include:

· Develop detailed workflows for the combined use of laser scanning techniques and relevant software

· Develop a National Grid specification for asset scanning and use of component/pattern recognition software to define deliverable/output requirements

· Develop the National grid 'base' class component libraries that allow the component /pattern recognition software to 'function'

· Review and compare other available component / pattern recognition software packages, to include future direction and alignment

· Develop the Asset Information Modelling coding and specification

· Develop Asset Information Models for two defined trial sites

· Investigate hybrid model approach i.e. convert assets with high value asset data and use raw scan images for non-converted items with low value asset data

· Visits to Dresden to discuss software development with Faro

· Produce fly through sequence for both trial sites of the completed model

· Update existing National Grid laser scanning specification and development with Lessons Learnt

· Bi-monthly engagement meetings/presentations with relevant stakeholders

· In addition, the knowledge transfer to all framework suppliers of how the efficiency is to be achieved; to be completed through a client specification and final recommendations report.

Scope

Following on from the BIM project, it was identified the 3D modelling created for the design of projects could incorporate automation, allowing for the accurate creation of up-to-date models of sites. Where BIM was used in design phase, this project incorporates non-BIM assets to model retrospectively. It is estimated this has the potential to be 25-50% more efficient than the current process for creating records for sites. A consistent interface is to be created, where asset records are captured, centrally updated, and interrogated by the asset owner/operator. Too often repeat site visits are required to capture individual data records; this proposal will reduce the abortive time to undertake this manual activity.

Objective(s)

- The generation of accurate operational records / documents that can capture and reference 'key' operational data
- Geographically positioned assets and asset models
- Establishment, interrogation and reporting of asset / operational information i.e. 'data mining' of the Asset Information Model
- Aid the identification, understanding and management of the asset health issues and the delivery of any associated projects
- Provide a consistent format and interface for the asset owner / operator

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

Success from the trial would be a demonstration of saving through the building of a retrospective 3D model of an existing site using component recognition.

Longer term, a key success criterion is to create a library of complex gas components which can be identified using enhanced shape recognition. This makes it possible to target a reduction in excess of 25% of the time taken to create a 3D model from a laser scan.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

Mostly desk based, with trialing in working environments across NTS.

Technology Readiness at Start

TRL4 Bench Scale Research

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Within the National Grid and Premtech offices and UK wide NTS sites for trial.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£662,000

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)

The current cost of updating records on a site varies with site complexity from about £20-£70k. The output of this project provides a significant saving on this figure, mainly based on a large reduction in the amount of time taken to create a model. This can be applied right across the network, potentially on over 600 sites.

Please provide a calculation of the expected benefits the Solution

Base Cost per site = ~£60K,

Method cost =~30k,

£30k Saving on per site.

If the technique is applied to just 10% of potential sites (60) , savings would be in the region of £1.8m

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

Can be applied to any AGI across the NTS. Further the method is applicable to gas transmission and distribution sites, and across all network licencees.

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

This will depend on the form of the solution, but is likely to be a low cost, mainly based around the utilization of off the shelf software at standard pricing to utilize the output of the method.

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

The Project can be used for creating more efficient and accurate AIM models at all Network Licensees' above ground installations.

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

The projec tis aligned to our reliability theme.

☑ 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