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NIA Project Registration and PEA Document

Date of Submission

Aug 2018

Project Reference Number

NIA_NPG_027

Project Registration

Project Title

Centrallock - remote access management system

Project Reference Number

NIA_NPG_027

Project Licensee(s)

Northern Powergrid

Project Start

August 2018

Project Duration

3 years and 1 month

Nominated Project Contact(s)

Sean Middleton

Project Budget

£725,000.00

Summary

Access to network assets is a critical activity for networks - both ensuring that the right people have appropriate access at the right place and time and also in ensuring those who should not have access are kept out.

Our standard iron key approach is increasingly difficult to manage to meet this requirement. Additionally alternative technologies can potentially deliver a whole new range of useful capabilities alongside vanilla asset security.

Software enabled locking systems are available but do not provide the levels of flexibility or security that are required. Nor do they overcome many of the issues of the current iron keysets.

This project aims to further develop, modify and trial a system based on technologies currently used in the banking sector that may be able to address the shortcomings of the currently available approaches.

Nominated Contact Email Address(es)

yourpowergrid@northernpowergrid.com

Problem Being Solved

Physical access to the Northern Powergrid network needs to be carefully controlled, from standard operational access to assets for maintenance to the protection of critical national infrastructure in accordance with government requirements.

Current access is primarily by physical, mechanical keys. There are currently around 10,000 of these in service of which some 200 are lost or stolen each year with subsequent reduction in overall system security with implications for national infrastructure..

In addition the management of access to assets for contractors and others who need temporary, albeit long term temporary, rights is difficult as the physical keys need to be distributed and then recovered at the completion of contracts.

Difficulties also arise during periods of inclement weather when we call upon mutual support arrangements from other DNOs. Access management potentially impacts our ability to restore customer's as quickly as we would like.

Further mechanical keys cannot provide auditable records of their use which may prove useful for safety of personnel and security of assets.

Additionally the suite of keys need to be replaced at regular intervals as the expiry of patent protection for key designs potentially leads

to issues with the availability of duplicate key sets and a consequential reduction in security.

Method(s)

With our partners, RT Design & Development (RTD) and Hodgson Sayers (HS), we have undertaken a desktop simulation of an IT and telecoms based remote access management system developed by for use in high security remote applications, typically bank automatic teller machines (ATMs). The system, facilitated in the field through standard mobile telephones with high security enabling software, appears to have the following attractive characteristics for utility use:

- Remote access approval
- Remote access control
- Dynamic reconfiguration of access rights and permissions.
- Full audit trail of access and egress activities with time-stamping.
- Potential link to alarm receiving centre.
- System based on current proven, company standard mobile phone technology, linked to a central control server.
- Can be reconfigured to provide ongoing protection without relying on patent protected mechanical systems which need replacing on expiry of the intellectual property protection.
- Can be used as part of a hybrid electronic/mechanical locking approach providing first point of entry security with more standard keys following.
- Full remote lockdown or global opening of sites.
- Potential to interface with existing fire and security systems.

We propose to trial this technology and assess its potential to overcome some of the problems inherent in the current physical access system and to assess the potential for long term cost savings both in terms of asset life cycle and improvements in operational efficiency.

The trial will be undertaken with regard to the requirements of loss prevention standard LPS 1175 and the legacy issues associated with the current door stock.

Product development, based on their pre-existing intellectual property, will be undertaken by the partner organisations at their own cost. Northern Powergrid will undertake the management of access to operational procedures, assets and the assessment of the system in line with the requirements of both ourselves and the likely requirements of other licenced network operators. A functional specification for such systems will be produced to allow the development of similar systems by other parties.

Scope

The scope of the project covers all sites and assets that require controlled access through the current key based access control system.

The innovative nature of this project is the use of a software facilitated locking and lock administration system, via mobile telephony, based on a technology adapted from a different but high security application. The use of insecure physical keys is eradicated and virtual keys with a variety of selectable characteristics such as one-off use can be created remotely and immediately.

Objective(s)

The project will deliver an assessment of the Centrallock systems capabilities and its suitability to be deployed across a range of electricity and other utilities access management applications. The system's capabilities will be assessed according to, but not limited by, the following:

- General assessment of the standalone use of the system on remote sites which are isolated from standard office access control systems
- Assessment up to BSIA Grade 4 level of access control
- Assessment of operation in both stand-alone and centrally managed access control modes dynamically switching between modes under the control of the central management control suite
- Assessment of the ability to fulfil a duty of care role by using a bespoke Smartphone application to stream live video to the control suite allowing users to be remotely monitored in hazardous conditions.
- Complete mechanical testing up to LPS 1175 issue 7 (security standard) to levels SR 1 to 4 with two selected door sets (Apeiron and Epsilon ranges).
- Confirm that security levels can be dynamically managed by the Management Suite and can have their firmware updated in-situ through the Smartphone
- Assess ability to retro-fit to Northern Powergrid's existing door sets from the Apeiron or Epsilon ranges
- Assessment of security of Centrallock transmissions features:
- Encrypts all confidential data using 128-bit AES

- Transport Layer Security (TLS) between the Management Suite and the Smartphone
- Assess Bluetooth Low Energy link layer encryption between the Smartphone and the electronic lock
- Ensure that lost or stolen Smartphones can be centrally blocked by the management suite meaning no more site visits to change locks when a user loses their key
- Ensure that all legal and regulatory standards required to achieve CE compliance
- Assess quality assurance in terms of ensuring that PINs are generated by the system to ensure that they are unique and none have 3 or more repeating digits.
- Development of a functional specification for remote access systems.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

The project will be considered a success on completion of the objectives laid out above. An early stage-gate will provide a go-no go assessment of the achievability of these objectives prior to the majority of the investment.

Project Partners and External Funding

Hodgson Sayers and RT Designs are project partners.

Costs are split three ways. The contribution of the two partners is two thirds of the disbursed cost of the project with an estimated value of £523k. The contribution from NPg via NIA is £242k. the total value of the project is therefore £725k.

Potential for New Learning

Remote access systems based on IT have not been trialled on network assets, the technology upon which the current project is based having been originally developed for high security banking applications. The current project seeks to determine whether the system can be developed for utility use, whether it can be retrofitted to current door systems, what additional operational benefits, such as improvements in restoration times under major incident conditions or lone worker safety, can be garnered through the use of such a system and what the economic impact of the system is on operational costs.

In addition the generic learning developed will be into a functional specification for alternative developers of such systems.

All of this constitutes new learning.

Improvements in the underlying technology, and associated intellectual property, are not within the scope, or funding, of the NIA. Such improvements are being funded and will be retained by will be retained by the partner organisations.

Scale of Project

Project scale is relatively small. Up to 10 different types of door will be initially investigated. A larger wider area trial is then contemplated to test network configurations and reliability, although this larger test will be designed and confirmed following the initial project stages.

Technology Readiness at Start

TRL3 Proof of Concept

Technology Readiness at End

TRL8 Active Commissioning

Geographical Area

Small exemplar area on the Yorkshire or North East network – to be determined.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£242,000

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 anticipated that an operational system, rolled out through the normal process of asset replacement, would save around 30% of the current replacement cost of the current system. This provides a saving of around £4m to the customer on each replacement cycle for Northern Powergrid.

In addition costs of ownership would be expected to fall and the current cost of replacement locks would be halved. This represents a further saving for Northern Powergrid of around £180k per annum across an entire life-cycle.

Both of these benefits would be reflected in lower operational costs and passed on to customers through the normal price control mechanisms.

Considering these benefits across the whole of the GB distribution network gives an estimated saving of around £40m over a lifecycle. Including transmission and gas networks would yield further customer benefits.

Additional benefits would also be available in customer service improvement through a reduction in restoration at times of extreme network stress. Also improved lone worker security and discouraging life-threatening, malicious trespass are additional tangible benefits that are difficult to value financially.

Please provide a calculation of the expected benefits the Solution

Base cost is approximately £3000 per site. Method costs is estimated at £1500 (high estimate).

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

The method will be potentially applicable to all secured asset types at all licensed operators which require controlled and secure access. The technology can be potentially applied at gas as well as electricity sites and is likely to have benefits for other utilities and operators of critical national infrastructure.

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

The cost is very low. It is anticipated that the system would replace the current mechanical key and lock suites as part of normal, routine asset replacement.

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

n/a

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

Improving the availability of the network and reducing the cost of operating and owning the network are both explicit needs within Northern Powergrid's innovation strategy that this project will help to address.

- 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.

No indication can be found, either in literature or from speaking with other DNOs that this, or systems of similar scope and ambition, have been trialled or implemented within the UK. The technology is being developed from another industry. Other electronic systems are available but these tend to be based on software enhanced physical keys and, requiring return to base for reprogramming do not have the flexibility and universality found in the proposed system.

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

No indication can be found, either in literature or from speaking with other DNOs that this, or systems of similar scope and ambition, have been trialled or implemented within the UK. The technology is being developed from another industry. The project utilises advanced technology developed for another high security application. The general state of technology advance in mobile phones, high

security encrypted applications, and wide area communications is now more advanced than previously and systems based on these rapidly developing technologies can only now potentially be relied upon for access solutions.

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

The project contains significant risk of technology and operational failure having never been applied for utility use before. As such it is insufficiently mature for BAU funding with the uncertain payback that implies.

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

Alternative sources of funding are unavailable for the technology to be developed from its current state of the art in ATM/banking applications to electricity applications. This is a porting project, neither research - and suitable for EPSRC or other research council funding - or effectively developing a new technology or product - the underlying technology now in place - and is therefore difficult to fit into funding streams for those types of activity such as Innovate UK. Further, the approach of ED2 planning means that it would be extremely useful that the project outcomes are available in 2 years times and the use of NIA funding allows us to meet that deadline. Waiting to see if other funding calls become available, if at all, would not allow that.

This project has been approved by a senior member of staff

Yes