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

May 2017

Project Reference Number

NIA_NGGT0111

Project Registration

Project Title

Aerial Imaging Research (AIR)

Project Reference Number

NIA_NGGT0111

Project Licensee(s)

National Gas Transmission PLC

Project Start

May 2017

Project Duration

2 years and 1 month

Nominated Project Contact(s)

Kevin Robertson , box.GT.innovation@nationalgrid.com

Project Budget

£60,000.00

Summary

The High Altitude Aerial Surveillance (HAAS) NIA project concluded in 2016 that no currently available survey system could meet the safety, technological, economic challenge of improving on the current helicopter patrol system against third party interference. However the project also concluded that technology in fields such as imaging, mapping, data processing and analysis, artificial intelligence, UAVs and satellites is moving very fast and any successor system would need to harness and combine a wide range of these technologies to be viable. For further information see High Altitude Aerial Surveillance (HAAS) NIA project NIA_NGGT0064.

Preceding Projects

NIA_NGGT0064 - High Altitude Aerial Surveillance (HAAS)

Third Party Collaborators

APEM Ltd

Nominated Contact Email Address(es)

Box.GT.Innovation@nationalgrid.com

Problem Being Solved

This project will deliver ongoing monitoring of selected technology fields and the periodic reassessment of technological maturity against our requirements as defined in TD1 and the HSE safety case and make recommendations about how and when to best develop a successor solution to the current solution for monitoring of third party interference to the NTS.

Method(s)

The research will be undertaken through a combination of a literature review, discussions with SAR and other equipment manufacturers, discussions with leading academics and other industry experts and attendance at leading technology shows and conferences.

The project will deliver:

1. Review the latest developments in airborne cloud penetrating imagery technology.

2. Review the latest developments in Satellite technology, both for SAR and for other sensors, such as high resolution optical data, taking into consideration resolution, coverage and return period of the satellites.

3. Review any other technologies that may contribute to a HAAS-successor project.

4. Review developments in processing algorithms in respect of automated change detection and how these developments may contribute to a HAAS-successor project.

5. Review developments in technology and licensing/permissions of other platforms that may help reduce the cost of data collection, such as drones or other High Altitude Platforms (HAPS).

6. Twice yearly updates and a detailed annual assessment on whether any technological improvements make a HAAS-successor project a viable option for National Grid.

7. A final report detailing all of the research undertaken.

Scope

The High Altitude Aerial Surveillance (HAAS) NIA project concluded in 2016 that no currently available survey system could meet the safety, technological, economic challenge of improving on the current helicopter patrol system against third party interference. However the project also concluded that technology in fields such as imaging, mapping, data processing and analysis, artificial intelligence, UAVs and satellites is moving very fast and any successor system would need to harness and combine a wide range of these technologies to be viable. For further information see High Altitude Aerial Surveillance (HAAS) NIA project NIA_NGGT0064.

Objective(s)

To deliver ongoing monitoring and assessment of the technological maturity and solution cost for selected technologies to inform the development of a future successor third party interference monitoring and reporting solution.

Consumer Vulnerability Impact Assessment (RIIO-2 Projects Only)

n/a

Success Criteria

1. Monitor progress in each selected field for the duration of the project.
2. Deliver a 6 monthly summary and 12 monthly detailed report of developments in each selected field and an assessment of technological maturity and cost of solution against our requirements.
3. Recommend how and when to develop a HAAS-successor solution.

Project Partners and External Funding

n/a

Potential for New Learning

n/a

Scale of Project

Desk based/trial in working environment/desk based and trial in working environment

Technology Readiness at Start

Technology Readiness at End

TRL3 Proof of Concept	TRL4 Bench Scale Research

Geographical Area

Desk based work at APEM offices and attendance at technology related events, conferences and briefings worldwide as required.

Revenue Allowed for the RIIO Settlement

None

Indicative Total NIA Project Expenditure

£60,000

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)

Savings will come from a combination of reduced cost of future solution to achieve the required standard of third party interference management combined with the cost savings from better avoidance of incidents of third party damage to the NTS. Avoidance of future incidents will eliminate future pipeline repair costs and compensation costs to disrupted network customers, typically of the order of several £000k to several £M.

Please provide a calculation of the expected benefits the Solution

N/A Research Project

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

Applicable across the entire UK gas transmission network, on both the NTS of National Grid Gas Transmission and the LTS's of the distribution network licencees.

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

At this stage it is not possible to estimate the costs of roll out because the nature of the solution could vary significantly, for example if may depend on satellite access, UAV operation, or bespoke data analysis methods costs.

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 learning developed will feed into the design of a successor solution to the current helicopter patrols for UK wide use by National Grid and to other network licencees that currently or in future contract third party interference monitoring from National Grid. As all Distribution Network operate LTS pipelines also at risk from third party interference the learning derived in this project will help derisk safe management of these assets.

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 project is aligned to our safety 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