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

Aug 2026

Project Reference Number

NIA_ENWL_047

Project Registration

Project Title

Visual Overhead Line Tracking Phase II

Project Reference Number

NIA_ENWL_047

Project Licensee(s)

Electricity North West

Project Start

September 2026

Project Duration

1 year and 3 months

Nominated Project Contact(s)

InnovationTeam@enwl.co.uk

Project Budget

£1,021,312.00

Summary

Building on Phase 1, VOLT Phase 2 will do real world trials across a section of the SP Electricity North West distribution network, enabling BVLOS drone deployments. The project will develop the operational, technical, and safety frameworks required for drones in a box (DIB) and remotely piloted BVLOS deployments. These capabilities aim to significantly reduce fault response times and enhance non-outage fault sensors response. Overall, the outcomes will improve network resilience, reduce customer interruptions, and provide benefits for vulnerable customers in remote or hard-to-access areas

Preceding Projects

NIA_ENWL_043 - Visual Overhead Line Tracking (VOLT)

Third Party Collaborators

Skyports Drone Services

Nominated Contact Email Address(es)

innovation@enwl.co.uk

Problem Being Solved

Distribution networks span thousands of kilometres of Overhead Lines (OHL), which must be kept in optimal condition to deliver power reliably to customers. When faults occur (whether due to vegetation contact, OHL wear, or storm damage) the timely identification of the fault nature and location is critical to dispatch the right teams and restore service quickly. Although non-outage faults indicators are deployed and help identify potential issues addressing these still require the dispatch of qualified personnel to the field engineers. Currently, this process often involves manual inspections across large sections of OHL, requiring in occasions multiple teams and extended time working on site under unfavourable conditions, delaying fault resolution and prolonging outages for customers. Routine

inspections could prevent many of these issues, or reduce their occurrence, but these duties are often constrained by limited resources and the remote location of the infrastructure.
VOLT Phase 2 aims to implement the recommendations from Phase 1 by deploying DIB to assess their effectiveness in reducing fault response times through rapid identification of the fault location and its characteristics. The project will also use signals from non-outage fault indicators to identify possible faults before they happen supporting proactive fault-detection and preventing future points of failure

Method(s)

VOLT Phase 2 is structured around a set of work packages designed to translate the Phase 1 recommendations into actionable solutions. Each work package contributes to building the capabilities needed for BVLOS inspections, pro-active fault detection and rapid fault response operations. Work packages are as follows:
WP1 – Enabling works. This work package will focus on the installation of the required electrical power supply, drone dock base, and communication equipment required to enable drone installation and flights. Additionally, this work package will cover the Regulatory approvals required from the Civil Aviation Authority (CAA) required to allow BVLOS flights in the target area.
WP2 – Equipment installation and Commissioning. This includes the procurement and installation of the 4no DIB and auxiliary equipment, as well as testing and commissioning.
WP3 – Customer Engagement. This work package will include press and customer communications to ensure residents in the trial area are informed about the activities taking place, engagement activities will take place across the project life cycle.
WP4 – Operations & Fault Response. 12-months of BVLOS enabled flight across the target area responding to actual faults, as well as fault drills to simulate Drone response in conjunction with SP ENW Operations and Control teams.
WP5 – Model Driven Image Analysis. A benchmark of the network health will be created using footage collected during WP4. This baseline will be compared against subsequent footage captured during fault‑response flights and non‑outage fault inspections. The model‑driven system will analyse the imagery to help proactively identify emerging faults.
WP6 – Final Report. Final report highlighting the project findings, cost value assessment, challenges and next steps for a wider network deployment.
This approach will provide the evidence necessary to set the foundations for future deployment.

Scope

Visual Overhead Line Tracking (VOLT) Phase 2 will trial BVLOS drone deployments to evaluate their benefit for customers and Distribution Network Operators. Drones will be used to respond to faults and signals from non-outage fault indicators for proactive fault detection, in a section of SP ENW licence network. This novel approach will be compared to the existing procedures, helping to understand how these new methods could improve network performance, reliability and customer outcomes.
The findings of VOLT Phase 2 will be reported presenting results, advantages and challenges of BVLOS Drone deployments integration and its impact in fault response times, proactive fault detection and customers electrical supply reliability. The project is structured around 6 work packages, as outlined in Section 2.2, these will culminate in a final report summarising outcomes and recommendations.

Objective(s)

The project aims to:
Assess the technical viability of fault response BVLOS Drone Deployments in SP ENW license area
Evaluate the technical viability of BVLOS drone deployments combined with non-outage fault indicators across the SP ENW licence area
Measure with live trials the economic impacts of BVLOS Drone Deployments in SP ENW license area
Test the impact of Model Driven imagery post-processing and non-outage fault indicators in enabling proactive fault-detection
Provide recommendations for operational deployment of BVLOS deployments across SP ENW license area

Consumer Vulnerability Impact Assessment

An assessment of distributional impacts (technical, financial and well-being related) for this project has been carried out using a bespoke assessment tool, which assesses the project as having a positive, negative or neutral effect on consumers in vulnerable situations. To help inform the assessment, this tool considers the categories of consumers identified in the Priority Services Register. This project has been assessed as having a positive impact on customers in vulnerable situations. The assessment has identified that this project will look to reduce faults duration and fault response time thus helping decrease outages duration for customers in general.

Success Criteria

Operations & Fault Response
Conducting BVLOS drone missions in line with CAA regulatory approvals, SP ENW safety Requirements and project governance.
Successfully dispatching drones in BVLOS missions in response to faults and non-outage fault indicators, for both drills and live faults

Customer Engagement
Engage with customers in the target area, ensuring clear communication of the trial and its outcomes, thus reducing significant complains
Model Driven Analysis
Identify potential faults with the combination of Model Driven Analysis and Non-outage fault indicators
Final Report
Present the results of the trial with lessons learned and recommendations on how enable a wider network of deployment of DIB

Project Partners and External Funding

Skyports Drone Services £80,000

SP ENW £21,800

Potential for New Learning

This project will provide real-world learning opportunities in BVLOS drone deployments for both fault response and proactive fault detection using non-outage fault sensors. It will also provide insight on how Model Driven imagery post-processing could enhance proactive fault-identification. This trial will also help establish the foundations to enable BVLOS drones flight across Great Britain. Project outputs will be shared through the ENA Smarter Networks Portal and the SP ENW website. We will also explore opportunities to present the findings at relevant conferences and industry events.

Scale of Project

The project will conduct live trials across a portion of SP ENW network license area trialling fault response and acting to non-outage fault indicators with BVLOS drone deployments. At project completion, a comprehensive report detailing the installation, fault-response impacts, newly established processes, and customer benefits will be issued

Technology Readiness at Start

TRL5 Pilot Scale

Technology Readiness at End

TRL6 Large Scale

Geographical Area

SP ENW’s distribution network license area

Revenue Allowed for the RIIO Settlement

N.A.

Indicative Total NIA Project Expenditure

£898,677

Project Eligibility Assessment Part 1

Requirement 1

Facilitate the energy system transition and/or benefit consumers in vulnerable situations

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

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

The project improves network resilience, accelerating fault localisation and enabling proactive fault detection, using signals from non-outage fault indicators. The installation of drones-in-a-box allows rapid BVLOS deployments providing near-real-time visuals to control room engineers, significantly reducing the time needed to locate faults and make operational decisions. This supports a more flexible, reliable network capable of accommodating growing electrification demands.

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

VOLT Phase 2 will reduce outage durations through faster fault detection and accelerated restoration. Drones can quickly assess faults in remote or hard-to-reach areas, improving response times for customers who typically experience longer interruptions. Near-real-time imagery helps control room engineers diagnose issues sooner and restoring power quicker, directly supporting those dependent on heating, medical equipment, or other equipment. Additionally, drones in combination with non-outage fault indicators can proactively identifying faults before they cause further issues, thus preventing outages before they occur

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

n/a

Please provide a calculation and/or description of the expected benefits of the solution

The expected benefits of Project VOLT Phase 2 are based on quantified findings from the VOLT Phase 1 Feasibility Study, which assessed 14 months of unplanned outage data from 1st of April 2025 to 10th of June 2026 on all Overhead Line Circuits across SP ENW licence area.
Phase 1 estimated that the use of drones for Fault Response across the network could reduce the cost of CI/CML approximately in £2.9M per annum across the whole of SP ENW OHL network. This is based in the assumption drones will save an average of 40 minutes per fault and that there are no regulatory or technical limitation in the drone capabilities to respond to faults.
Project VOLT Phase 2 aims to put to test the assumption made on Phase 1 and confirm the actual benefit and challenges for BVLOS Drone operations for Fault Response.

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

The results from the trials could apply to all utilities with overhead infrastructure across GB, providing a capable partner is contracted or that the drones’ capabilities are developed internally within the licensees

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

This project will identify potential use cases for rollout by Great Britain networks. The indicative cost of a standalone Drone in a Box (including the drone) is approximately £40,000, with a further £5,000 estimated for installation. Final costs will be dependent on the number of units procured and site-specific requirements. Additional operational costs, such as maintenance, pilot availability, and ongoing support, are not included within the Drone in a Box unit cost and shall be analysed on a case-by-case basis.

Requirement 3 / 1

Involve Research, Development or Demonstration

Projects 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

Involve Research, Development or Demonstration - Please select all that apply

☐ 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 learnings from VOLT Phase 2 are intended to be applicable across all GB electrical networks licensees. The project will explore the use of BVLOS drones deployment for fault response and proactive fault detection across electricity distribution network helping to reduce the fault response time.
Learning will be shared through regular updates, final reports, and stakeholder forums. Progress meetings, workshops, and industry collaborations will ensure knowledge reaches network licensees and relevant parties. Key outputs, will be widely distributed, fostering replication, scalability, and adoption across the energy sector.

n/a

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. Networks must explicitly mention similar projects that they have considered and how these differ.

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

A review of the Smarter Networks Portal and conversations with other networks and has revealed similarities in the use of drone with projects such as:
Autonomous Aerial, Thermal Inspections of Substation
Virtual OHL Inspections: Combining Statutory Inspection & Condition Based Assessment
Eye in the Sky
Beyond Visual Line of Sigh Aerial Inspection Vehicle
Aerial Inspections of OHLs form Beyond Visual Line of Sight

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

Visual Overhead Line Tracking (VOLT) Phase 2, focuses on using drones for fault response and to enable proactive fault detection, using signals from non-outage fault indicators, all by BVLOS missions which haven't been successfully carried out by other Networks in GB. BVLOS operation of drones currently requires a specific derrogation from the CAA to be carried out in UK airspace.

Additional Governance And Document Upload

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

VOLT Phase 2 is innovative because it introduces the first GB Drone-in-a-Box BVLOS drone operation focusing on DNO fault response and proactive fault detection, triggered by non-outage fault detectors, enabling much faster and more accurate fault localisation and resolution than traditional ground patrols. The project also pioneers the integration of BVLOS deployments into live distribution network processes, assessing the viability for the rollout of these deployments across GB DNO's. Together, these elements represent a step‑change in how overhead line inspections and fault responses are delivered.

Relevant Foreground IPR

There are no background IPRs associated with this project beyond the existing expertise and tools of the project partners. However, the project is expected to generate Foreground IPR in the form of research reports, processes, and operational methodologies for BVLOS drone operation of electrical distribution network for fault response.
All Foreground IPR generated through this project will be managed in accordance with the Ofgem governance.

Data Access Details

Data generated can be requested by interested third parties by contacting the innovation team in accordance with our data sharing policy which is available on our website

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

The project involves exploring an unproven and innovative methodology involving DIB BVLOS drone deployments, which carry technical, regulatory, and operational uncertainties. Unlike standard practices, BVLOS is not yet widely adopted, and DIB is an unproven approach in GB. The effectiveness, safety, and compliance pathways are still being evaluated for both.

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

NIA funding is essential for this project as it is designed to explore an unproven methodology—BVLOS drone deployments—This approach introduces key risks:
Operational risks:
Integrating DIB BVLOS drone deployments into existing DNO fault response workflows will require exploring existing processes and creating new processes without disrupting supply and current DNO operations, which haven't been done before.
Regulatory risk:
Since BVLOS drone flights for fault inspections haven't been tested nor authorised in GB before, there's a risk the CAA may not grant the required derogation required for the project to proceed. Resulting in DNO funds expenditure that could be used in other matters, and not testing a technology which aim to increase network resilience
Commercial Risk:
Without a real-world trial, there is no validated evidence that BVLOS drones will deliver measurable benefits to GB customers or represent a worthwhile investment for DNOs. Although Phase 1 indicated a potential five-year return on investment, this estimate is based on highl evel assumptions and modelling, which would require to be validated against real operational conditions, fault types, weather constraints, or integration impacts on existing DNO workflows.
We have reviewed other potential funding mechanisms, including the Strategic Innovation Fund (SIF), and have determined that NIA is the most appropriate route for this project.

This project has been approved by a senior member of staff

☑ Yes