

NIA Project Registration and PEA Document

Date of Submission

Oct 2025

Project Reference Number

NIA_ENWL_043

Project Registration

Project Title

Visual Overhead Line Tracking (VOLT)

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NIA_ENWL_043

Project Licensee(s)

Electricity North West

Project Start

October 2025

Project Duration

0 years and 11 months

Nominated Project Contact(s)

Martin Tejada

Project Budget

£31,973.00

Summary

The evolving regulatory landscape for drones is unlocking the potential for Beyond Visual Line of Sight (BVLOS) operations, enabling scalable missions across rural and remote areas. These operations can rapidly identify faults and accelerate power restoration—especially for vulnerable households such as the elderly, medically dependent, and low-income families. Beyond reactive response, BVLOS also supports proactive fault detection and emergency logistics, enhancing grid resilience, operational efficiency, and service continuity during severe weather events.

Nominated Contact Email Address(es)

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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.

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 aims to address these challenges by enabling BVLOS drone operations, this will allow drones to perform proactive maintenance checks, identifying vegetation risks before they cause faults, and rapidly detect and locate issues when they occur, accelerating response times and improving resilience for vulnerable consumers—elderly, medically dependent, rural and low-income households.

Method(s)

This project will be delivered through desktop research and stakeholder engagement to explore regulatory changes enabling BVLOS drone operations and assess their potential benefits for fault detection and maintenance across SP ENW's distribution network, ultimately improving service to vulnerable customer.

It comprises four work packages:

- **Work Package 1. Workshop & Summary:** A collaborative session between drone specialists and SP ENW personnel to identify operational challenges and explore BVLOS-enabled solutions for fault location, proactive maintenance, and emergency response.
- **Work Package 2. GIS Analysis:** A spatial assessment of SP ENW's network using GIS to identify areas suitable for BVLOS deployment, associated risks, and zones with regulatory constraints.
- **Work Package 3. Regulatory Landscape:** A detailed review of UK BVLOS regulations, enabling mechanisms (e.g. predefined corridors, TDA usage, CAA sandbox), and EU policy influences, with guidance on regulatory engagement and pilot PoC requirements.
- **Work Package 4. Use Cases & Final Report:** A strategic roadmap summarising finding, commercial viability, and prioritised BVLOS use cases with feasibility rankings and implementation recommendations.

This approach will provide the evidence necessary to set the foundations for potential live trials in the future.

Measurement Quality Statement:

Although this project does not involve physical testing, measurement quality remains important within the information collecting, and comparison, in order to deliver a compelling and accurate final report. Inputs and assumptions, network data, and GIS data used will be based on real assets from SP ENW.

Data Quality Statement:

All data used or generated during the project will be reviewed to provide assurance that outputs meet the required standards. Data will be managed in accordance with the RIIO-ED2 Data Best Practice Guidance and Data Assurance Guidance, including version control, audit trails, and appropriate documentation. No personal data will be processed as part of this project.

Scope

Visual Overhead Line Tracking (VOLT) will assess the feasibility and value of BVLOS Drone operations to benefit both customers and the Distribution Network Operators. Based on real locations and data from SP ENW licence area, this project study will compare different types of operations, including but not limited to: Rapid storm response, Drone-in-a-box, Vegetation encroachment monitoring, Integration with SP ENW fault detection technologies, that will bring more value to customers more value to customers.

Project VOLT will be a desktop study including a comparison of drone operations and areas that this operation would bring a greater impact, a Regulatory landscape reviewing the UK regulations and enabling mechanism for BVLOS operations and comparing these to the EU policies. The findings of this report will be summarised in a strategic roadmap highlighting next steps and implementation recommendations.

The project will deliver benefits to the GB Electricity Distribution System, including:

Financial:

- Reduce CI/CML penalties by decreasing the fault response time
- Reduce CI/CML penalties by enabling proactive maintenance thus preventing certain faults from happening

Operational:

- Reduce downtime after storms or faults as drones can identify location of these events faster

Social:

- Provide quicker support to customers in remote areas

The project is structured around four work packages, as outlined in Section 2.2, covering technical feasibility and regulatory review. These will culminate in a final report summarising outcomes and recommendations for next steps.

Work Package 1. Workshop & Summary focus area

- SME's from both SP ENW and Skyports will share knowledge and explore other possible solutions for BVLOS Drone operations

Work Package 2. GIS Analysis focus area

- Using GIS to identify areas of SP ENW suitable for BVLOS operations

Work Package 3. Regulatory Landscape focus area

- UK Regulatory Landscape Mapping
- EU Policy influences

Work Package 4. Use Cases & Final Report focus area

- Roadmap summarising finding and ranking solutions by commercial viability and customer benefit
- Implementation recommendations and next steps

Objective(s)

The project aims to:

- Assess the technical viability of BVLOS Drone Operations in SP ENW license area
- Assess the economic impacts and benefit of BVLOS Drone Operations in SP ENW license area
- Review regulatory and compliance considerations
- Provide recommendations and roadmap for potential futures trials and operational deployment

Consumer Vulnerability Impact Assessment

Whilst the project does not target customers in vulnerable situations, it is expected to deliver indirect benefits to these groups. One of the objectives of VOLT is to improve network resilience by identifying faults quicker and prevent others by enabling proactive maintenance even in remote or difficult to access locations, which can affect vulnerable customers.

Success Criteria

- **Workshop & Summary**—Collaborative session between SME's from both SP ENW and Skyports to share knowledge and explore other possible solutions for BVLOS Drone operations
- **GIS Analysis**—A spatial assessment of SP ENW's network using GIS to identify areas suitable for BVLOS deployment, associated risks, and zones with regulatory constraints.
- **Regulatory Landscape focus area**—Detailed review of UK BVLOS regulations, enabling mechanisms, and EU policy influences, with guidance on regulatory engagement and pilot PoC requirements.
- **Use Cases & Final Report**— A strategic roadmap summarising finding, commercial viability, and prioritised BVLOS use cases with feasibility rankings and implementation recommendations.

Project Partners and External Funding

Skyport

Potential for New Learning

This project will provide valuable insights into the current capabilities of drones BVLOS operations, as well as explore additional functionalities that could benefit both electrical networks and customers. It will also outline the regulatory enablers for BVLOS operations and identify the further steps required to make these operations a practical reality.

The project outputs will be shared via the ENA Smarter Networks Portal and the SP Electricity North West website. We will also seek opportunities to present findings at relevant conferences and industry events.

Scale of Project

This project will include a desktop study of BVLOS drone operations in the SP ENW license area, focusing in zones where the operations could bring greater value to customers.

Geographical Area

SP Electricity North West's distribution network license area

Revenue Allowed for the RII Settlement

£0

Indicative Total NIA Project Expenditure

Project VOLT expenditure is estimated to be £31,973, which will come from the NIA fund allocation. From this amount £8,653 correspond to SP ENW fees. Contractual delays prevented the project to start on the agreed date of October 2025, delaying the start until May 2026. Extending the project end-date will allow activities to be completed satisfactorily

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:

n/a

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

Project VOLT will lead the way in demonstrating novel methods for faster fault detection and power restoration through BVLOS drone operations, which are particularly effective in remote and storm-affected areas where inspections are slow or impractical. These operations can proactively identify risks such as vegetation encroachment and asset degradation, helping prevent outages before they occur. By improving emergency response times and reducing downtime, VOLT enhances service continuity for elderly, medically dependent, and low-income households.

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

N/A

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

The results from the desktop study could apply to all electrical network assets across GB, providing a capable partner is contracted or that the drone 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 trial by GB networks.

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 are intended to be applicable across all GB electrical networks licensees. The project will explore existing and future legislation that will enable drones BVLOS operations across electrical distribution network assets, as well as evaluating different drone operations, identifying the ones that maximize benefit for both customers and networks operators.

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, LCNE, 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 has not revealed any other project addressing this specific issue.

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

Project VOLT is driving innovation by exploring a wider range of drone operations enabled through Beyond Visual Line of Sight (BVLOS). While drones are already deployed across parts of the GB network, primarily using Visual Line of Sight (VLOS) operations, BVLOS applications remain limited, with only a few successful use cases to date.

VOLT aims to expand the potential of BVLOS by identifying new operational opportunities and examining the existing regulatory mechanisms that enable BVLOS in GB. By addressing current limitations, VOLT will unlock advanced methods for asset inspection, support proactive maintenance, and enable rapid fault detection and location.

These enhancements will significantly accelerate response times and strengthen network resilience—particularly benefiting vulnerable consumers in remote or storm-affected areas.

Relevant Foreground IPR

There are no foreground 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.

All Foreground IPR generated through this project will be managed in accordance with the ENA framework

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 BVLOS drone operations, which carry technical, regulatory, and operational uncertainties. Unlike standard practices, BVLOS is not yet widely adopted, and its effectiveness, safety, and compliance pathways are still being evaluated.

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 operations—This approach introduces key risks:

- **Regulatory risk:** The UK Civil Aviation Authority is still developing frameworks for BVLOS, including atypical airspace and SORA models. Navigating these evolving regulations requires strategic engagement and may involve complex permitting processes.
- **Operational risk:** Integrating BVLOS into existing DNO workflows will require exploring which areas would bring more benefit and less disruption to customers, which is not yet known as this haven't been done before.

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