



The future

NIA Progress Report

NIA_ENWL006
Sentinel

22 July 2016



VERSION HISTORY

Version	Date	Author	Status	Comments
v.1.0	20/07/2016	K Bailey	Final	Final version following internal review and comment

REVIEW

Name	Role	Date
A Howard	Programme Manager	21/07/2016
D Randles	Network Performance and Innovation Manager	21/07/2016
P Turner	Future Networks Delivery Manager	21/07/2016

APPROVAL

Name	Role	Date
Steve Cox	Head of Network Engineering	22/07/2016

CONTENTS

1	PROJECT BASICS	4
2	SCOPE	4
3	OBJECTIVES	4
4	SUCCESS CRITERIA	4
5	PERFORMANCE COMPARED TO THE ORIGINAL PROJECT AIMS, OBJECTIVES AND SUCCESS CRITERIA	5
6	REQUIRED MODIFICATIONS TO THE PLANNED APPROACH DURING THE COURSE OF THE PROJECT	5
7	LESSONS LEARNT FOR FUTURE PROJECTS	5
8	THE OUTCOMES OF THE PROJECT	5
9	PLANNED IMPLEMENTATION	5
10	OTHER COMMENTS	5

1 PROJECT BASICS

Project Title	Sentinel
Project Reference	NIA_ENWL006
Funding Licensee(s)	Electricity North West Limited
Project Start Date	September 2015
Project Duration	4 years
Nominated Project Contact(s)	Geraldine Bryson (Geraldine.Bryson@enwl.co.uk)

2 SCOPE

The fault location equipment will be installed on approximately 10 – 20 HV networks, monitoring faults across the feeders. The precise numbers will be informed by the cost and the need to obtain data to support development. Networks will be chosen based on length of overhead line, earthing arrangement and network topology. Consideration will also be given to those circuits which have a higher incidence of faults. The fault sensing technologies will be integrated into a central dashboard which will display the results from all of the selected sites.

3 OBJECTIVES

- To install a range of fault location equipment expected to cover two main techniques ie impedance-based and travelling wave.
- To develop preferred methods for the installation of distance to fault systems including equipment at the primary substation and distributed devices such as sensors on OHLs etc. This will include an assessment of the preferred location of the sensors and where/how precisely these sensors will be connected to the system.
- To compare and contrast the performance of the different techniques and/or different manufacturers against the different network types. The results of these trials will be used to inform specification and engineering policy for the application of HV distance to fault on UK distribution networks.

4 SUCCESS CRITERIA

- Development of functional specifications for fault location technologies
- Successful deployment of fault location techniques
- Specification for the integration of results from trial equipment into a central dashboard
- Verification of the accuracy of the techniques by confirming the fault location
- Understanding of how each technique works for the different network types.

5 PERFORMANCE COMPARED TO THE ORIGINAL PROJECT AIMS, OBJECTIVES AND SUCCESS CRITERIA

The project is on plan against the original aims, objectives and criteria.

The challenge for Sentinel is to integrate two technologies capable of providing distance to fault locations for low impedance (high current) faults and high impedance (low current) faults. The solution to low impedance faults is mature technology; however, the solution to high impedance faults including identification of low clearance lines is novel and innovative. The challenge is to not only develop the technologies to work independently but to also complement one another.

Following two workshops the project research and concept development phase has been completed along with the product requirements. An outline of the complete system architecture has been completed including a project initiation document (PID) which details the functional design.

The system will include numerous devices, some of which are mature technologies. The first prototype device for high impedance fault identification went into the design and build phase in May 2016. The high impedance fault location system will use a high frequency signal injection method. In order to develop the algorithms, electromagnetic transient studies have been carried out using network data for multiple OHL circuits, typical of the environment/construction in which the devices will be deployed.

6 REQUIRED MODIFICATIONS TO THE PLANNED APPROACH DURING THE COURSE OF THE PROJECT

There have been no changes to the planned approach.

7 LESSONS LEARNT FOR FUTURE PROJECTS

The project is in its early stages and at this point there are no lessons to share. This will change as the project progresses.

8 THE OUTCOMES OF THE PROJECT

Not applicable.

9 PLANNED IMPLEMENTATION

Not applicable.

10 OTHER COMMENTS

Not applicable.