SIF Alpha Project Registration

Date of Submission

Dec 2022

Project Reference Number

10037451

Project Registration

Project Title

Predict4Resilience (P4R) - Alpha

Project Reference Number

10037451

Project Licensee(s)

SP Energy Networks Distribution

Project Start

Aug 2022

Project Duration

6 Months

Nominated Project Contact(s)

Rui Rui

Project Budget

£617,235.00

Funding Mechanism

SIF Alpha - Round 1

SIF Funding

£499,999.00

Strategy Theme

Data and digitalisation

Challenge Area

Data and digitisation

Project Summary

Our Predict4Resilience (P4R) Alpha phase will look to prototype a "weather fault prediction tool" including the following:

- Prototype the Fault Forecasting Engine which is the fault predicting statistical model using weather forecasts and historical data, such as weather variables and satellite imagery.
- Carry out further user engagement with other DNOs and potentially other infrastructure operators to capture wider user needs and ensure the project continues in a direction to be commercialised and maximise uptake and value.
- Build Wireframes/Mock-Ups of the user interface to inform the Beta Phase design and development.
- Write a blueprint which evolves along the implementation of Agile Methodology to guarantee a fast start at Beta Phase.
- Develop a refined business case incorporating additional user needs from wider user engagement.

This addresses the Innovation Challenge by taking a data driven approach and

combining state-of-art weather forecasting and novel statistical methods to revolutionise the process of electricity network fault prediction.

Currently, control room engineers rely on basic weather forecasts combined with experience and intuition when making decisions about where to allocate resources to restore supply. These decisions are not data-driven and are subject to human bias. When a storm is approaching the UK, decision-makers are hesitant to release their engineers to other districts, as they may be exposing their network to a higher risk of lengthy outages. This leads to an overall slower response rate, as resources tend to be allocated after faults have occurred.

The P4R application could be used by Control Rooms and Emergency Response teams to enhance operational management, decision making and preparedness in advance of any severe weather event. These users should be provided with a forecast of the expected number of faults based on a weather forecast. Concise, specific and visual data will enable the users to comprehend the information and develop an effective response plan. In the Discovery Phase, we have developed a deep understanding of users' optimal needs, which will be built into sprints during the Alpha Phase

Through the proof of concept of P4R in terms of technical capabilities and business value of fault prediction in general in the Discovery Phase our understanding of the problem has evolved -- for example, we have learned that:

- A 5-7 day operating window is sufficient for control room engineers to make operational decisions and
- The priority is the accuracy (i.e. fault prediction) in this window.

We will build on this in Alpha to deliver a fit-for-purpose solution.

To deliver the objectives of the Alpha Phase, SPT have established partnerships with:

- **SP Distribution** will provide user knowledge to inform the model and will witness the functionality testing of the prototype in various sprints. We will also engage with other licensees to ensure interoperability.
- **SIA Partners:** with extensive experience in control room operations, they will lead the technical development of the prototype platform with an agile approach and analyse the best commercialisation pathway for the tool.
- **The University of Glasgow (UofG):** as one of the leading UK universities in the fields of statistics, engineering, and energy forecasting, they will contribute to the modelling and building the prototype.
- **The MET Office:** utilising their expertise, data sets and learnings they will provide guidance to UofG and Sia Partners in the deployment of weather forecasting data to statistical and machine learning models.
- **NG-ET** will provide additional network knowledge to support the development of an interoperable solution.

ARUP is no longer part of the consortium, as it was mutually recognised they were not best placed to continue the prototype development (now led by SIA Partners). A full handover of learning is already underway.

Project Description

Predict4Resilience aims to develop an application which uses data science to predict the impact of severe and adverse weather on the electricity networks. Our idea is to improve our control room's preparedness against the faults caused by severe and adverse weather events, which can be forecasted up to two weeks ahead via the "weather fault tool". We see this as improving data quality (to be used in our statistical post-processing), and access (to both our data and the Met Office) to improve the security and resilience of the network. These techniques convert weather forecasts into impact forecasts, in this case forecasts network

faults, which are more accurate and result in better decision-making than using raw weather forecasts only. What make this project innovative is the work on weather-related fault prediction, probabilistic fault prediction, and medium range forecasting. **No other past innovation projects have considered probabilistic fault prediction and related decision-support, leaving a significant gap in DNOs' predictive capability.** Such capability offers many advantages:

1. Increased accuracy by leveraging advanced weather forecasts, new data sources, and machine learning,
2. Short- to medium-range forecasting with uncertainty quantification, enabling new modes of risk management and increasing resilience though early warnings up to one week ahead, and
3. Consistent forecast data easily made available to all internal and external stakeholders supporting open data and establishing cohesive

Preceding Projects

NIA_SPEN_0066 - Predict4Resilience - Discovery Continuity

10025656 - Predict4Resilience

Nominated Contact Email Address(es)

innovate@spenergynetworks.co.uk

Project Approaches And Desired Outcomes

Innovation Justification

We must minimise outage periods and the associated Customer Minutes Lost (CML) as part of any maintenance or fault; with the currently available information, estimating the impact of an event on maintenance and local fault volumes heavily relies on user judgment. P4R needs SIF funding to support our level of ambition within 6 months, accelerating our predictive capabilities..

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3. Consistent forecast data easily made available to all internal and external stakeholders supporting open data and establishing cohesive practices.

This capability will benefit the DNOs with better prediction of faults, improved responses to faults, decreased CML, and reduced unnecessary abortive costs of cancelled planned works, creating a more resilient network.

There is still a journey to develop this solution. As for any innovative data-driven project, there is a need for consistently produced accurate outcomes validated by users. In addition, the quality of the output is highly dependent on the consistency and accuracy of available data. In the current price control, there are no alternative funding mechanisms to SIF that could support the adoption of this project given its, risks, IP specifications, collaborative requirements and scale of innovation.

Specifically, innovation is required in:

- **Weather-related fault prediction** which has not benefited from advances in digital technologies. We will leverage newly digitised asset health data with high-resolution ensemble numerical weather predictions to produce a worldleading capability.
- **Probabilistic fault predictions** which enable risk-based decision-making. Furthermore, the nature of faults, being relatively rare resulting in sparse data, requires specific statistical modelling, drawing on extreme value theory. We will develop an appropriate modelling capability to be used in combination with ensemble weather forecasts. This will accurately predict the likelihood of faults occurring across an entire electricity network for the first time.
- **Medium-range forecasting** - using ensemble numerical weather prediction to quantify the probability of future weather occurring in the days ahead. The further ahead we predict, the more uncertainty weather forecast become. However, ensemble NWP quantifies this uncertainty, providing information on probability of different weather situations arising.

The accuracy with which faults will ultimately be forecasted by this capability is unknown, and therefore a risk. However, in the Discovery Phase, a literature review was carried out and a proof-of-concept fault forecasting method was implemented which verified the feasibility of the above innovations. In addition, our models have shown forecasts are highly accurate in days 1-5, a key timescale for operational planning. It was also found that the method successfully predicted

significant events resulting in large numbers of faults. This exercise has de-risked the project and identified key areas for development improving forecasting.

In addition, from engagement with our users and literature review, we have seen that forecast improvement and business value are attainable in the case of fault prediction, although the nature of faults (low-probability events occurring primarily during severe weather) presents a new technical challenge for forecasters.

Resilience continues to be of high importance to our sector and the project aligns with Government policies regarding the future of UK energy infrastructure, including the National Infrastructure Commission's Resilience Framework. Not developing this capability will leave electricity networks vulnerable to weatherrelated faults at a time when the frequency and severity of adverse weather events is increasing due to our changing climate.

Benefits

This data-driven approach of the Weather Forecast System (WFS) can transform human-centric decision-making practices and improve maintenance decisions. The enhanced asset management and emergency response capability will deliver benefits to consumers through fewer/shorter interruptions, to the environment through reduced emissions, to the network through avoided costs, and lastly to the wider industry through transferrable learnings.

During Discovery, the core benefit identified by SPEN's Control Room engineers was savings in CML through early access to a credible fault caused by wind and gale. On this basis alone, a quantitative analysis of the associated savings, presented in the Business Case appendix, is based on the development cost required and the net savings across 10 years to calculate:

- The benefits/costs ratio: 1.76
- The Net Present Value: £430k
- The Payback period: 6 years

The CML cost savings will only increase substantially when other weather-related faults, such as those caused by snow, sleet and blizzards, are included, thus further reducing the payback period.

In addition, as a social benefit to consumers, reduced CML translates to faster reconnection times and better communication when faults occur which can result in reduced stress during an outage. Based on the DNO-wide Social Value guidance, provision of information and faster connection will help consumers cope with outages. In alpha, we will use the SROI tool to quantify this further benefit.

The baseline for annual savings of developing P4R is assumed to be 5% in the business case. During the Alpha phase, we will work to validate this assumption and measure how it will impact the duration of outages for consumers. This will help us assess the benefit to consumers with financial metrics.

Benefits to the Network

Credible forecasted location and number of faults will result in avoided costs to the network on a few fronts including more strategic response team mobilisation and avoiding the abortive cost of planned maintenance. In addition, early fault forecasts will improve operational practices and decrease the reliability of backup generators. Lastly, P4R will enable more proactive maintenance to protect and increase the lifespan of assets through the understanding of weather-related impacts.

These benefits have not been measured so far due to the limitations of the Discovery phase. The proof of concept in the Alpha phase will help us introduce

operational metrics of Control Room engineers and the response team to measure the operational efficiency and consequently savings to the network. However, this will not be quantifiable until the Beta phase.

Benefits to the Environment

The foreseen environmental benefits of P4R will result from reduced CO2 from avoided unnecessary logistics and diesel generators as well as reduced scope II and III emissions from purchasing new equipment and materials due to prolonged life of assets, With the operational metrics defined during Alpha we will have a more accurate estimation of associated CO2 reductions.

Other benefits

We have also foreseen additional societal and cross-sectoral benefits that are not quantifiable. Including :

- Embedding learnings in the continuous development of SPEN's Control Room and Resource Dispatch (transferable to T&D Asset Owners, and the Oil and Gas Industry)
- Providing similar services to other utilities operators and cross-sector infrastructure operators
- Potential reduction of H&S incidents and staff exposure to extreme weather hazards

The P4R WFS is closely aligned with the six aspects of National Infrastructure Commission (NIC)'s proposed Resilience framework: anticipate, resist, absorb, recovery adapt and transform.

Risks And Issues

To identify project risks early, we will start engaging with the right stakeholders before project kick-off to identify risks, mitigation actions, and monitoring plans, and we will maintain frequent communication through brainstorming sessions, weekly project meetings, workshops and monthly sponsor updates throughout the Alpha Phase.

Project documentations such as the risk register (RAID log) and assumption register will be updated and discussed in an iterative manner. Project risks and issues will be tracked by risk owners, the project manager, and the portfolio manager through robust project documentation and effective project communication to evaluate the effectiveness of risk response plans and allow the project to progress smoothly on time.

The main risks we have foreseen are:

- The delivery of an effective prototype within limited time and resources. To mitigate this resource risk, Sia Partners will be brought on board to develop the prototype. Sia partners bring in the expertise in data science and software development, as well as knowledge of control room operation required. Sia Partners will finish the handover process and conduct capacity planning before Alpha project starts. A list of precise and realistic objectives will also help optimise the resource planning and further de-risk.
- The accuracy of the fault forecasting model. This has been de-risked by Discovery Phase proof-of-concept statistical modelling and literature research and will be mitigated by the new expertise on statistical methodology from Dr Daniela Castro-Camilo from UofG. This risk will also be mitigated by Sia Partners' knowledge and experience in data science.
- System scalability. This can affect the later stage of Alpha Phase and Beta Phase and is mitigated by the addition of Sia Partners to the consortium, who have experience of developing scalable software in various sectors. Engagement with other DNOs from the start of the Alpha phase will help further mitigate this risk during the project.
- Unavailability of key project data. The delivery of an effective fault prediction engine is heavily dependent on the collection of datasets of sufficient accuracy.

Engagement within SPEN and with project partners (UofG and Met Office) as well as literature research during the Discovery phase have allowed us to identify the required data and to de-risk this. These mitigation activities will be continued during the Alpha phase, to further mitigate this risk and plan for alternative approaches.

During the Alpha phase, the monitoring of ongoing risk mitigation and of the state of identified risks will be a continuous activity.

Foreseen and unexpected IP generated during the project will be identified, reviewed by the team and captured in an IP register. This will capture the IP itself, its formality and the share breakdown where appropriate (in line with SIF Governance Ch9). At the project conclusion the full IP register will be reviewed, and all relevant foreground IP will form part of the dissemination activities.

All partners have signed, or will sign, collaboration agreements with SPT which have been tailored to support Ofgem funded innovation projects under SIF -- this was derived from established NIA and NIC formats which have proven successful for many years. The conditions of these terms are such to retain freedom to operate and remain aligned to SIF Governance practices. No subcontractors are being utilised within the project.

There are no regulatory barriers which have been identified by the project team or expert assessors in Discovery assessment. The primary risks, as described, are managerial or technical in nature and have clear mitigation strategies to resolve. We would welcome engagement with UKRI if there are regulatory barriers to our solution which we have not foreseen.

Project Plans And Milestones

Project Plans And Milestones

Our aim is to deploy and integrate a platform which can predict faults as a data driven probability from weather forecasting. So far, the main outcomes from Discovery are:

- A functional specification
- A Cost Benefit Analysis
- A user needs profile
- The success criteria for an MVP
- An implementation and evaluation of a proof-of-concept Fault Forecast Engine.

Therefore, if we consider the Alpha a bridge to justify Beta investment, we require the work packages below:

Work package 1: Fault forecast engine development.

Lead partner: Sia Partners

Key Tasks:

1. Literature review
2. Addition of new data sources -- Engage with partners and data providers to understand available data, obtain relevant datasets, process and store them.
3. Extraction of explanatory features -- Using previously obtained and processed datasets, identify explanatory features for faults.
4. Development and test of the method -- Build algorithms to predict faults and test them.
5. Report writing on the method

Work package 2: Solution design & development

Lead partner: Sia Partners

Key Tasks:

1. User engagement -- Plan for and conduct user engagement to define use cases for the solution.
2. UX design -- Translate the use cases into User Experience (UX) including features, interfaces, navigation, notifications etc.
3. Engagement to test/validate -- Engage again with users to test the UX; collect feedback to improve initial designs.
4. Adjustment of UX -- Based on collected feedback, adjust the UX to ensure best fit with user requirements.
5. Report writing on engagement
6. Development of a backend prototype -- Based on the designed UX and output of work package 1, design a backend solution; build a prototype of this solution and test it.
7. Development of UI prototypes -- Based on the designed UX, build several UI prototypes to demonstrate feasibility.
8. Report writing on the solution

Work package 3: Commercialisation

Lead partner: Sia Partners

Key Tasks:

1. Further Benefit assessment -- Quantify the solution benefits.
2. Engagement with DNOs - Engage with other DNOs to capture their s, requirements and constraints for the solution.
3. Refined Cost assessment -- Quantify costs of the solution.

4. Go to market strategy development - Based on previous tasks, develop a go to market strategy for the solution.

Work package 4: Project management

Lead partner: SPEN

Key Tasks:

1. Project management activities: SPEN will lead a series of regular project progress meetings where actions and risks will be reviewed and assigned to the team. Our RAID log will ensure that we clearly document this and can enable our monitoring officer to be satisfied in the project delivery and outcomes. These sessions will also be used to review best use of resource and ensure that internal experts are prepped for providing support. Finally, an internal escalation process is established to be used if required.

Milestones / success criteria: (Project payment by milestone is included in the project plan appendix)

M1: Fault Forecast Engine method demonstrated / Successful test of the fault prediction concept on selected areas and events

M2: Engagement & UX report validated / Validation of the document by project partners

M3: Fault engine method report and Solution report validated / Validation of the documents by project partners

M4: Backend and UI prototypes finalised and tested / Successful test of the backend and UI prototypes

M5: Go to market strategy validated / Validation of the document by project partners

In Alpha phase, Sia Partners will join the consortium, and Arup will no longer be in the project team. This adjustment is based on the resources and expertise in data science and software development needed to address the technical challenges of this phase.

Regulatory Barriers (Not scored)

There are no regulatory barriers which have been identified by the project team or expert assessors in Discovery assessment.

Business As Usual

Following the project Beta phase, where we would see a demonstration of this platform successfully deployed within SPEN's control room, we envisage the following BAU approach:

BaU Adoption

In Alpha, we plan to widen our engagement with other DNOs in the UK to capture the range of user needs and requirements, which will guide both the forecast model development and the UI design. This should both support the dissemination of learning and future rollout to other licensees.

We will share our blueprint, methodologies, and policies with other licensees to allow wider uptake. This can also be used inform competitive tender exercises for sourcing the platform from the market. All relevant foreground IP will be captured and shared through regular dissemination events.

The intention to develop the forecasting platform in close collaboration with the

end users of the tool (who have already been engaged to understand needs and potential benefits) will ensure a successful roll-out.

Continuous Improvement

We will take several steps both within the Alpha and Beta lifecycles as well as throughout the BaU adoption and monitoring process including; regular review of user needs, feedback on solution suitability (to capture a snagging list), apply a change management process (such as ProSci) to ensure that our wider users adopt the solution and buy in to it. We will then also ensure it is accounted for in our BaU IT reviews.

The minimum weather and network data is fed using established data channels and secure SPEN servers following the same protocols that previous projects have followed to ensure continuity of data flow. These policies will be reviewed for appropriateness as part of an Alpha and Beta phase, continuing to involve the end users.

In accordance with the UK Government Digital Service's Service Toolkit, the Beta Phase will need onboarding and training, whilst the support and maintenance should also focus on continually improving the solution. The improvements to the solution shall be undertaken through capturing user feedback, analysis of monitoring data and success measures (e.g., developing a list of Key Performance Indicators to monitor the performance), and undertaking ongoing user research.

Market Stimulation

We expect that by having the methodologies and blueprints for the solution developed with other licencees and under SIF Governance, we will be able to stimulate the market and tender for the solution once established.

Internal Buy-in and Sign-off

We have strong buy in from our user groups, including senior management who are providing key resources for knowledge capture workshops.

The control room team will have responsibility and sign-off that the solution is integrated and working to their satisfaction with Sia Partners being primarily responsible for the implementation of the innovation; we have confidence in the approach as Sia Partners has previously developed and deployed a software application for SPEN's Control Room successfully.

Funding Strategy

Our internal funding strategy will be to fund ongoing costs via our TOTEX allowance, although we will consider if the outcomes warrant a re-opener. We expect that for the final solution to be accepted (and commercialised), that the cost-benefit to the business will be clear and an overall saving will be realised which includes such on-going costs. Our internal application processes (such as PASDA) will be utilised for the adoption process.

Commercials

Commercialisation

Sia Partners, a global consultancy company with expertise in business solution development, has been identified as the relevant partner to Design, Build and Operate the solution. Between SP Energy Networks and Sia Partners the consortium has enough reach and will not require to form new partnerships to take the solution to market. Sia Partners has a presence in key locations across the

globe and already operates in the industries targeted, with a strong focus on Energy & Utilities. As such, they are ideally placed to package the solution during Beta phase, develop the appropriate go-to-market strategy and be the driving commercial force of the fully developed solution.

Also, as part of Iberdrola, SPEN would highlight these activities at the global watchdog forums and would invite EU licensees who also are more vulnerable to extreme weather; SPEN has a working relationship with EU utilities through Horizon 2020 where it has previously developed interoperable control room toolkits.

On the consumer side, the solution will allow us to reduce the customer minutes lost and thus the time spent using fossil-fueled generators (reducing CO2). In addition to avoiding costs for the Network, as discussed in question 3, the solution will have benefits for consumers, the environment and wider society. Specifically, reduced CML delivers wider societal benefits such as reduced stress during an outage.

While the solution will be primarily adopted by GB electricity network operators, we anticipate the solution will have an international reach. Evidence has shown that climate change has contributed to longer and hotter heatwaves, more persistent droughts, more frequent wildfire, and more extreme rainfalls. Those events happen across the world and, outside of GB, other electricity network operators are facing similar challenges. Members of our consortium own and operate, or work closely with, most European DSOs and TSOs, as well as some North American ones. This provides an opportunity to increase reliance of electricity networks globally, and a direct route to international markets. More specifically, increasing network resilience in Europe would have an indirect positive impact on its interconnected GB market.

Moreover, we can already envisage the solution to support other industries relying on similar network infrastructure. The telecom and rail industry are industries of choice where faults related to weather events impact the provision of their services. Sia Partners has access to major players in these industries. During Alpha phase, we expect to reach out to members of these industries to understand the potential for the solution.

We do not see our solution undermining competitive markets as we anticipate that the blueprints for how to achieve the solution will be disseminated to any interested parties, which will support third parties in developing their own offerings. As a result, we envisage a stimulation of markets rather than an inhibition.
The solution is expected to bring new additional capabilities to its users. It will allow for greater preparation and anticipation of network restoration activities and enable networks to make statistically informed decisions regarding resource allocation in response to weather related faults. The data driven approach will transform human-centric decision-making practices, reducing the workload and reliance on the 'gut feeling' of control room engineers, and improve processes and maintenance decisions' efficiency by optimising travel routes, for instance.

At this stage, the commitment of the consortium is limited to the Alpha phase. During the Alpha phase, we will look to develop further the commercial model of the solution and the associated funding required. Sia Partners cultivates expertise stemming from R&D activities and is committed to Innovation.

Intellectual Property Rights (Not scored)

All partners have confirmed their position to align to the default IPR position as outlined in SIF Governance Chapter 9. Each partner will sign a collaboration agreement with SPT which contains a specific schedule to align to this position. Any background IP will be clearly documented, and all Relevant Foreground IP

will be captured in an Intellectual Property Register. The objective of the register is to ensure clarity and transparency to all partners around the Intellectual Property arrangements.

At the end of the Alpha phase, and depending on the outcomes of the Alpha phase and Beta submission, each partner will be able to confirm their position regarding the final solution. The partners will ensure transparent dissemination of knowledge and potential transfer of ownership of Intellectual Property Rights if required. The commercialisation work package will further develop the arrangements for successful roll out of the solution and the associated licensing of background and foreground intellectual property rights, in accordance with the Royalties arrangements described in the SIF Governance.

Costs and Value for Money

The proposal asks for £499,999, with a total cost of £617,235 (with almost 20% voluntary contribution of in-kind staff-hours from the consortia).

We see this as offering clear value for money as in-kind staff-hours enable the project teams to work flexibly to deliver project aims, drawing on further additional resource if required beyond current anticipated needs. The partners are willing to take on this risk in this phase and are committed to working flexibly to ensure delivery is made on time. This includes ensuring the data from each owner is available with a clear delivery pathway so assessment can begin immediately (the data channel will be tested, and data volume checked for missing volumes before project start).

The resources given to this project would be committed to other projects or core BAU activities; however, we see the innovation in this area as priority based on the identified user needs and benefits and have established this team as a result. In comparison to other activities in this area, a successful SIF outcome would radically accelerate the effort required to realise the project scope compared to other avenues. Furthermore, our scale of ambition represents value for money as we have clear scope to provide a commercial pathway and route to market -- this additional work will generate more value at the end of the Alpha phase.

Most costs are with Sia Partners, who will conduct the majority of the planned works. Their participation is crucial due to their experience and expertise in the solution development, in addition they have contributed over 10% of their time in kind to evidence their own interest in the project success. Our experience of their capability to deliver credible solutions in a tight time scale and work on critical infrastructure (such as control room data flows) lends increased confidence to the project. SPEN has made an increased contribution in-kind to support this arrangement as we view this as the best chance of success.

In addition, the project team is leveraging experience and learning from past projects, such as PRAE, which will feed into this proposal, enabling us to deliver the tasks within the timescales. Sia Partners were involved in this and we see that their experience will ensure that our ambitious scope can be delivered in the tight timeframe. Establishing this consortia will develop significant learning which will have wide applicability and transferability, which we will disseminate as a team.

The complexity of the technical challenge to address, along with the business expertise required to understand activities in the Control Room, justifies the need for senior resources. Sia Partners has ensured that the appropriate level of seniority was represented on the programme, while giving higher workload to more junior supporting resources. This brings higher value for money to the project by reducing overall rates and total costs yet ensuring quality of delivery.

Sia Partners cultivates expertise stemming from R&D activities and the proximity with its clients' industries. As such, 4% of Sia Partners' revenues are invested in

R&D activities. They have a dedicated decision process with identified opportunities to develop solutions for various challenges. Sia Partners recognise the potential of the Fault forecasting solution and are committed to supporting SP Energy Networks in the development of this solution during the Alpha phase.

Supporting Documents

Documents Uploaded Where Applicable

Yes

Documents:

SIF Alpha P4R Business Case.pdf

SIF Alpha P4R Skills and Expertise Appendix.pdf

SIF Alpha Project Registration 2022-12-06 11_15

SIF Alpha Project Registration 2024-02-20 11_10

This project has been approved by a senior member of staff

☑ Yes