Scottish & Southern Electricity Networks
TRANSMISSION

SIF Alpha Round 2 Project Registration

Date of Submission

Nov 2023

Project Reference Number

UKRI10079053

Initial Project Details

Project Title

INSIGHT - Innovative Network Status Intelligence Gathered by Holistic use of Telemetry

Project Contact

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Challenge Area

Preparing for a net zero power system

Strategy Theme

Net zero and the energy system transition

Lead Sector

Electricity Transmission

Project Start Date

01/10/2023

Project Duration (Months)

6

Lead Funding Licensee

SSEN - Scottish Hydro Electric Transmission

Funding Licensee(s)

SSEN - Scottish Hydro Electric Transmission

Funding Mechanism

SIF Alpha - Round 2

Collaborating Networks

National Grid Electricity System Operator

Technology Areas

Measurement

Control Systems

Modelling

Network Monitoring

Electricity Transmission Networks

Fault Management

Project Summary

INSIGHT aims to deliver a real-time alert and control system that monitors and mitigates different types of power network oscillation events. The Project will combine learnings from past events with new modelling and simulation techniques to better understand the nature of these new oscillations and how to predict and address them in network design and operation for future events.

INSIGHT will improve our ability to manage weaker networks, enhancing stability and reliability and avoiding alternative operations that would reduce the levels of renewable generation able to run on the network.

Add Preceding Project(s)

UKRI10051585 - INSIGHT (Innovative Network Status Intelligence Gathered by Holistic use of Telemetry and Simulation)

Add Third Party Collaborator(s)

University of Strathclyde

Project Budget

£252,553.00

SIF Funding

£227,093.00

Project Approaches and Desired Outcomes

Problem statement

Problem evolution

Building on learnings from the Discovery Phase, Alpha aims to predict, understand, classify, and manage new forms of system instability on a network becoming increasingly dominated by inverter-based electronic sources. Power system oscillations (typically fluctuations in voltage/frequency/power), present major security risks to the network. Traditionally, these oscillations are influenced by the electro-mechanical dynamics of synchronous generators (SGs) occurring in the low-frequency range (0.1 to ~2 Hz). With the rapid increase of inverter-based resources (IBRs) required by renewables, e.g., wind, solar, and High Voltage Direct Current (HVDC), new types of power system oscillations have been observed in real-world power systems in locations including the UK, North America, Australia, and China. These oscillations can occur in a wider frequency range caused by IBR controllers' behaviour in weak system conditions or undesirable interaction among various IBR control actions, thus can be driven by different factors such as system strength and converter configuration.

In Discovery, we conducted an extensive literature review engaging international stakeholders to understand the global perception of relevant issues. This highlighted that all transmission operators are in a similar position, with an awareness of the growing risks but only tentative steps taken to address them. Potential solutions are being proposed but not thoroughly tested and demonstrated. Our proposal is based on our understanding that we are at the forefront internationally with a project that commits to the further development of requirements, with the prospect of a future demonstration on real-life networks.

Innovation Challenge aim and theme

The project scope continues to be aligned with challenge area 2 (Preparing for a net zero power system) with its thematic focus being 'new ways to support low-stability system'. The INSIGHT innovation is a key element in managing a weaker network, helping to maintain system stability and security, and minimising system operation costs. The expansion of monitoring and supporting data analytics also aligns with the broader strategy of digitalisation across energy networks.

Users

A questionnaire was sent to numerous organisations in the UK and globally, and an expert workshop held by the project partners to gather stakeholder feedback. The responses highlighted growing concerns that the current oscillatory damping capability is insufficient for the future network with an increased risk of oscillation events.

INSIGHT will combine experience and learnings from past events/projects with new modelling and simulation techniques to better understand the origin and nature of different types of oscillations and investigate potential methods for predicting them. State-of-the-art techniques for detecting, classifying, and responding to oscillation events will be reviewed, evaluated, and trialled. The project will also inform codes and standards relating to new oscillations, and potentially lead to a new form of service targeted at control actions for oscillation damping.

Innovation-funded relevant work

Whilst stability in systems dominated by power electronics is currently an industry focus area, there are no projects developing the type of solution to manage system oscillations and disturbances proposed in INSIGHT.

Projects like TOTEM and other initiatives like Grid Code Modification GC0141 have progressed GB activities in modelling and simulation, supporting the further investigation of oscillatory stability proposed herein.

Current projects like INCENTIVE, or past projects like Phoenix and EFCC, have developed and demonstrated the types of technologies that could be used to mitigate oscillations, with the ESO's Stability.

Past projects like VISOR and MIGRATE, and subsequent code modification like that to STCP 27-01 on sharing of real-time monitoring data, have advanced the TOs' and ESO's approach to real-time measurement, with an ongoing programme through RIIO-T2 to deploy more equipment and collate data.

Synergy with these projects will be explored thoroughly during Alpha using key contacts.

Innovation justification

Challenge theme

INSIGHT addresses the SIF Innovation Challenge 2 Theme 2, focused on exploring novel ways to reliably support low-stability systems by developing innovations in technology and standards that help deliver the power system required for Net Zero by 2035. The Project seeks to understand, classify, predict, and define actions to manage potential new forms of instability (e.g., oscillations in voltage, power, and/or frequency) on a system dominated by power electronic sources (such as wind generation, HVDC converters, STATCOMs.).

Innovation

Unlike projects elsewhere in the world where post-analysis has been done, INSIGHT aims to develop proactive identification and classification of oscillation risk and recommendations to inform planning, operation, and mitigation strategies. Instability risks related to new phenomena are not underpinned by normal practices/analysis, therefore there is insufficient understanding within the networks about how to predict or mitigate them. Proactive identification and classification, combined with new standards and codes to support the management of these oscillations, represent new areas of analysis, tools, systems, and processes not yet available to GB nor developed comparably elsewhere.

Stakeholders

Stakeholder engagement was instrumental in Discovery helping confirm the industry-wide extent of the problem. This included issuing an open questionnaire and inviting comments on the Project. During discovery, meetings of the two GB ESO-TO working groups with the greatest interest in the Project have been attended: the Scottish System Performance Working Group (SSPWG)and the ESO-TO Forum on System Events.

The review of the State-of-the-art identified the targeted area of innovation, a significant technological advancement in real-time oscillation monitoring, rapid analysis, and automated response.

Knowledge gaps

INSIGHT will build on learnings and outputs from other stability-related projects (e.g., VISOR, MIGRATE, EFCC, DOME) and extra system visibility/data provided by the existing (RIIO-T2 or otherwise) deployed schemes of Phasor Measurement Units across the network. INSIGHT will use system modelling and data collection to understand causes and inform actions. The SSPWG is also undertaking related work focused on reviewing specific issues from past events. INSIGHT focuses on developing knowledge and understanding and modelling techniques to produce a meaningful test environment and platform that allows the design, development, testing, and implementation of proactive system actions to mitigate oscillations within GB's network.

There have been significant amounts of work previously across the industry looking at technology/processes to identify and mitigate oscillations driven by classic synchronous generation. These are lower frequency and more predictable via classical modelling and screening techniques – allowing mitigation during the system planning and design phase. The more unpredictable and less understood nature of IBR-driven oscillation requires innovative techniques to manage and cannot be designed out or mitigated in planning timescales due to the uncertain nature and pace of network development.

The Discovery Phase has allowed us to fully investigate and define the problem, with reference to assessing experience globally and how it can be utilised and understood to provide solutions. Stakeholder engagement and review of academic and global practical experience have shaped the vision of the Project, ensuring alignment with international best practices.

SIF funding need

There is a significant level of uncertainty and technical risk with the practicality of a technical solution becoming usable as a real operational tool, well beyond the levels of a normal RIIO-funded project. The project requires extensive collaboration across GB industry, including TOs, ESO, delivery providers, and academic partners. This would be very difficult to achieve with a standard project. Shared learnings and a possible successful solution will deliver value to the GB consumer if the solution is well-documented and applicable to all GB/other network operators.

Impact and benefits (not scored)

Financial - future reductions in the cost of operating the network

Environmental - carbon reduction – indirect CO2 savings per annum

New to market - services

Impacts and benefits description

Financial - future reductions in the cost of operating the network

The current process of managing oscillations on the system is to restrict the output of generation (which is suspected to be the source of the oscillations) or to operate TO devices in a way that prevents them from interacting with the oscillations.

The cost of these options is two-fold:

1. There is a need to buy off generation in the balancing mechanism.

2. Restrict the capability of the system and therefore introduce constraints that require costly intervention to manage flows within the imposed limit.

These mitigations need to be in place for an unspecified time, until investigations have concluded the source of the oscillations and put mitigations in place.

A CBA has been developed to demonstrate the improvements to the network's system operability because of the INSIGHT solution. The annual balancing mechanism cost for the UK network is £2.406 billion (2022/23). Implementing the INSIGHT technology could deliver an annual cost saving of over £20 million (based on an assumption of a 1% cost saving).

One example of balancing costs incurred previously is the actions taken after significant oscillations, most evident in northern Scotland, in August 2021. The response included paying hydro generators to switch on, constraining wind off, and adjusting outage plans. These types of events are expected to become more frequent unless projects like INSIGHT can identify appropriate mitigation.

The benefit of INSIGHT will ultimately be measured through a reduction in balancing costs incurred by the Electricity System Operator due to the occurrence, or the perceived risk, of oscillatory instability. Short of the financial metric, the benefit could be measured by the number of actions taken to address oscillatory instability, which may include instructions to TOs that do not incur balancing costs.

Environmental - carbon reduction - indirect CO2 savings per annum

Currently, the balancing actions taken to manage oscillations on the system have the potential to increase CO2 emissions, as low-carbon sources of generation are replaced with carbon-based sources of generation as they can be turned on/off and up or down as needed to balance the system.

INSIGHT will help reduce the CO2 emissions that occur when trying to manage oscillations on the network by providing the technology to predict or mitigate them ahead of time.

New to market - services

As described above, oscillations on the system are currently managed in a way such that the source(s) of the oscillations are located, and mitigations put in place. There is work underway to implement a stability market, though this doesn't address oscillations directly as it aims to address exacerbating factors (a gradual "weakening" of the transmission system), to prevent oscillations from happening.

A future outcome of INSIGHT is that users may be contracted to modify their operating point, adjust settings, or activate different control functionality to mitigate oscillatory stability risks. The development of a market for these new types of services is dependent on the learning expected from the project.

Teams and resources

The Project partnership will comprise SSN-T, the University of Strathclyde, and NG ESO as per Discovery although more targeted stakeholder engagement is planned in Alpha and includes detailed discussions with several European Transmission Operators, (e.g., RTE, Elia, and TenneT), and potential technology solution providers. Through Discovery an industry-wide questionnaire was

completed which broadened the awareness of INSIGHT. This engagement will be a platform for more in-depth conversations within Alpha.

The partnership maintains all the necessary skilled resources to transition into and deliver the Alpha Phase.

SSEN Transmission (SSEN-T) will lead the project and provide the necessary expertise in Operational and Planning and System Performance. The Operational and Planning and System Performance teams are experts in understanding real-life oscillatory instabilities in the SSEN-T transmission network and can provide real system data and ensure the project remains focused on the industrial requirements, alongside National Grid ESO.

The National HVDC Centre has industry-leading experience with simulating system instabilities and assessing possible solutions which can be demonstrated in its world-class testing facilities before being introduced onto the network. They are the only UK simulation and training facility designed to support all HVDC schemes in GB and their team has delivered previous SIF Discovery and Alpha projects.

University of Strathclyde (UoS) is one of Europe's leading power system research groups whose principal areas of expertise include 'protection and control for future power network operation' with industry-recognised experience in power system modelling, real-time monitoring and frequency control for low-inertia systems all of which are essential to the success of this project. The team has been involved with other SIF projects (INCENTIVE), and large collaborative power system control projects such as the Enhanced Frequency Control Capability (EFCC) project with National Grid.

National Grid Electricity System Operator (NGESO) through their power systems team will provide valuable insight from the entire UK transmission network and share operator experience and expertise of previous oscillations. Moreover, their involvement and learnings from projects such as VISOR and DOME can be applied to INSIGHT and ensure there is no duplication.

Equipment:

The National HVDC Centre hosts a Real-Time Digital Simulator (RTDS) facility that allows network oscillatory events to be modelled and their impact measured. Moreover, it can be used to evaluate control strategies and their effectiveness in dampening oscillatory instabilities. Access to this specialist equipment will be factored into the project plan and the mitigation would be to use Strathclyde's RTDS if scheduling challenges arise.

Additional Parties:

As part of the engagement activities within Work Package 2, NG ESO and SSEN-T will hold knowledge-sharing events with other Transmission Owners (TOs) such as SP Transmission, National Grid, and others internationally to ensure the innovation meets the requirements of a wide range of potential users. Whilst these organisations are not partners per se, their contributions and input are of significant value.

Work Package 2 also incorporates resources and time to identify and meet with potential technology solution providers as a means of understanding their capability and motivation to become a partner in the Beta Phase, in which their solution would be tested using the oscillation modelling data produced in the Alpha phase.

Project Plans and Milestones

Project management and delivery

The Alpha phase project has been divided into six work packages with the total SIF funding request being £227,093 and the partners contributing a total of £25,460.

Approach to Project Management SSEN-T will follow its well established robust and proven project management processes successfully applied to SIF Round 1 Alpha Phase projects by applying an agile, flexible, and adaptable approach through the project. Moreover, a dedicated SSEN-T SIF process document [PR-NET-GOV-532] was produced at the request of the auditing team and will be followed in the execution of SIF projects.

WP1: Project Management [Lead: SSEN-T]

· Weekly project partner meetings to discuss progress, issues, risks and ensure all funding requirements continue to be met.

· Delivery of all project milestones and deliverables and ensure a plan for Beta is developed and a decision is reached on proceeding with an application.

WP2: Engagement: Stakeholder and Technology Providers [Lead: NG ESO]

· Hold knowledge sharing events including participants in completed projects that explored a similar theme, namely VISOR.

· Build on discussions held during Discovery, such as with NPL on power quality measurements and Neuville on improved power grid frequency monitoring.

· Engage further with potential Technology Providers to understand more fully how best to specify future requirements.

WP3: Oscillation Events Model [Lead: Strathclyde. The National HVDC Centre will have a considerable involvement in this WP]

· Development of network models that enable Inverter Based Resources (IBR) system oscillation events to be simulated.

· Sensitivity study in simulation to determine the key parameters and monitoring specifications.

· Run simulation trials to home in on the most effective mitigation strategies.

WP4: GB System Monitoring Roadmap [Lead: SSEN-T]

· State of the Art review of current similar technologies including a technology gap analysis.

· Review of GB's current industrial practice for oscillation management.

· Proposal for project learnings and how they can benefit GB and international design standards.

WP5: Development of CBA [Lead: SSEN-T]

· Review and update the CBA such that the data can be viewed with a greater level of confidence.

Risk management strategy

SSEN-T has compiled a list of risks as part of the INSIGHT Alpha Project Management (built upon the Discovery Risk Register) and will hold regular reviews with all partners to update the risk register. The risks are assigned to the most applicable partner and are distributed as evenly as is practicable to help ensure no one partner is overly burdened.

Proposed stage-gates

A Beta Phase go / no go review.

Supply interruptions

There are no interruptions for consumers during this Phase of the Project.

Access to the energy services

Although it has not yet been considered in detail, project will assess the potential use of energy consumers as a potential mitigation of oscillatory instability risks. For example, there may in the future be a risk of control system interaction involving large energy consumers that use converter-controlled equipment, where adjustments to that equipment are deemed the most effective means of mitigation. However, this is only a possibility and no direct engagement with energy consumers is being considered currently.

Key outputs and dissemination

The project team will work collaboratively to ensure the key targeted outputs are delivered and the knowledge learned is disseminated via a wide range of routes and platforms.

More specifically, the key outputs, for the Alpha phase, and the partners leading the delivery are:

SSEN-T and The National HVDC Centre:

· An initial evaluation of different solutions providers and a list of the most promising solution(s) that could be explored and potentially evaluated/ tested within the Beta phase.

· A roadmap for rolling out the identified solution(s) in the GB power system.

· A cost benefit analysis of deploying the identified solution(s) in the GB system.

University of Strathclyde:

· A set of representative real-time network models that are suitable for simulating and replicating different types of IBR-driven oscillation events.

· Simulation results with comprehensive data sets collected for detailed investigation of different IBR-driven oscillation events.

· A report summarising the key findings from simulation of the developed models and recommendations for testing, validating and trialling potential real-time monitoring and control solutions provided by manufacturers.

National Grid ESO:

· A list of stakeholders that will participate in the Beta phase, focusing on testing and trialling of potential solutions.

All partners - led by SSEN:

· Technical specifications for measurement and monitoring solutions that are required for detecting and analysing IBR-driven oscillation events.

· A detailed plan for key activities that comprise the Beta phase.

The outputs and learning will be shared and disseminated via the following routes and led by the named partners.

SSEN-T and National Grid ESO:

· Meetings and presentations to stakeholders engaged by National Grid ESO (see WP2) – this will include the participants who were part of the survey conducted in the discovery phase.

· The stakeholder group of The National HVDC Centre.

· Presentations in the ESO-TO Forum.

· Presentations in the Scottish System Performance Working Group.

University of Strathclyde:

· Conference and potential journal publication. Targeted conferences for attendance include IET Renewable Power Generation and Future Power Systems Conference Glasgow in Nov 2023, and IEEE Power & Energy Society Innovative Smart Grid Technologies Conference (ISGT) in Oct 2023, LCNI conference in Nov 2023.

· Webinar, technical talk in events organised by professional organisations, e.g., CIGRE.

· Meetings with professional working groups. The project team members are part of various international expert working groups, which provide an ideal platform for sharing project outcomes on the international stage.

In addition to the above activities, the project team will periodically provide project updates via social media (e.g. LinkedIn) and will also aim to organise dedicated project dissemination events to share the project outcomes.

Commercials

Intellectual property rights, procurement and contracting (not scored)

The default IPR arrangements will be applied as defined in the SIF Governance Document and INSIGHT Collaboration Agreement (CA) signed as part of the Discovery Phase. The intention is to review the CA as part of the Alpha Phase to ensure it is relevant although the IPR arrangements are not expected to change.

There are no plans for any subcontract arrangements, tenders, or procurements to be run by any partner during the Alpha Phase. If detailed discussions do prevail with third parties, an NDA will be put in place beforehand to protect confidentiality.

A request for information (RFI) will be issued in collaboration with SSEN-T's procurement team during the Alpha Phase to potential technology solution providers of monitoring and data processing systems that may address the technical challenges that are the focus of the project. This RFI will inform the design of a possible procurement process to be undertaken in the Beta Phase. Exact dates are still to be decided but the RFI is likely to be issued in the second half of the Alpha Phase, i.e., during the first quarter of 2024. The RFI will be issued according to the procurement processes followed by SSEN Transmission in anticipation of possible future procurement in the Beta Phase or during the deployment phase using that route.

An IP register will be established and maintained identifying background and foreground IP relating to each partner's involvement in the project.

Commercialisation, route to market and business as usual

INSIGHT aims to identify and demonstrate the most appropriate technologies for real-time monitoring and control of system oscillations. Potential technology providers will be identified based on our learning from the Discovery Phase and through further market review. The Alpha Phase will build relationships with the providers and develop a strategy for assessing options in Beta Phase.

INSIGHT builds on several interrelated activities already underway in the TOs and NG ESO, which provide the basis for a route to deployment. This includes the expansion of system monitoring facilities and the sharing of real-time data as specified by **STCP 27-1** and informed by past projects such as VISOR. The modelling and analysis undertaken in the NIA project TOTEM, amongst others, and the ongoing work in the Joint Planning Committee sub-groups provide essential inputs to the proposed work. The TOs and ESO have already implemented various automatic control schemes on the transmission network and the ESO is progressing further in its use of direct control signals to Users. INSIGHT promises a significant step forward in the understanding and management of oscillatory instability in a converter-dominated network, but these past and current industry initiatives provide the foundation for future roll-out. Nevertheless, setting out the details of that roll-out requires effort and collaboration across multiple parties, which is why WP4 in the Alpha plan is focused on developing a roadmap for implementation.

The route to a commercial system is expected to occur in several phases, depending on the outputs of Alpha. The Beta phase aims to create a real-time alert and control system tool that alerts the ESO and network owners of operational risks and has the facility to prompt appropriate mitigating responses automatically or via manual intervention. Beta Phase will include at least one solution provider whose control system will be thoroughly interrogated and developed such that it is fit for purpose. The deployment will follow, which may include additional offline testing before the system is installed on the live network.

We may first see a 'TO only' system with the development of new solutions that can be installed within the operational technology network(s) of the relevant TO, to control TO-owned and operated assets. This could be delivered as part of the normal RIIO regulatory framework process if the project establishes that it is beneficial for the GB consumer for it to be installed and developed.

This may be followed by an ESO-managed system that can also control and recommend (or directly instigate) actions using User assets as well as TO-owned assets. This would require development of the relevant market frameworks and industry practices.

WP5 Development of CBA will consider the specific requirements of how the benefits of the project can be fully quantified, and any needs for an ESO-managed system can be developed.

SSEN-T is investing massively in the transmission network in northern Scotland and can deliver these massive programmes of work. While the development and implementation of new solutions as envisaged by INSIGHT will come at a cost and involve

significant complexity, this will be relatively small in comparison to the wider programme of SSEN-T work.

NG ESO has consistently demonstrated its ability to trial and introduce novel approaches to system operation and the use of new technologies, from the Pathfinder projects to world-first implementations of new monitoring systems. Roll-out of INSIGHT will build on this and be aligned with other change programmes as required to ensure the best value for GB consumers.

SSEN-T's senior sponsor for INSIGHT is David McKay, Director of Asset Management and Operations with another key stakeholder being Ryan Tumilty – Head of System Performance.

Policy, standards and regulations (not scored)

There are not considered to be any regulations, policy or standards presenting barriers to the delivery of this project. It is anticipated that project learning will inform future Grid Code and STCP modifications to fully harness the opportunities and this will follow the normal code management processes.

It is not anticipated that there will be a need for any changes to government policy or to standards outside of Ofgem's remit.

The system monitoring roadmap being developed in Alpha (WP4) will consider more fully any impacts and possible changes to industry codes and standards. This will include looking at improving clarity of obligation, specificity of requirement and general improvement of the standards to cover for oscillatory instability events.

NG ESO and SSEN-T play important roles in ensuring the safety of our power networks, including reviewing compliance of designs and operations with the relevant codes and standards. The development of new tools for monitoring and data interpretation will help improve those compliance processes.

In the Discovery phase, the project established a relationship with the National Physical Laboratory (NPL), whose area of expertise is the development and maintenance of measurement standards. This dialogue will continue through Alpha to allow INSIGHT to benefit from its expertise and ongoing work in related areas.

SSEN-T does not envisage that the Alpha phase or any future phase of INSIGHT will require a specific derogation or exemption from any current industry codes, standards or policy.

Value for money

The project will utilise the existing facilities for simulation and analysis at Strathclyde University and The National HVDC Centre, including its high-value state-of-the-art real-time digital simulator (RTDS) environment supported by other high-powered computing resources and associated simulation software licenses. This highly specialised equipment has been funded by other initiatives and, hence, its use in the project offers added value to the consumers.

The total Project costs for the Alpha Phase are detailed in the attachment with the overall cost being £252,553, well below the imposed SIF limits.

The project is requesting SIF funding of £227,093 representing 90% of the total project costs with the project partners providing the remaining 10% which meets the compulsory contribution. The benefits to the Consumer of developing and implementing the INSIGHT technical solution have been refined as part of the Discovery phase through a Cost Benefit Analysis and could reach £8 million in a saving of network operability costs, based on a conservative set of assumptions. This figure is based on current operational costs which are set to increase significantly in the second half of the decade meaning that the financial benefits to the consumer could reach tens of millions.

SSEN-T is requesting £75,228 of SIF funding to lead the project, manage its delivery and provide technical guidance to the other partners. This figure also includes the National HVDC Centre resource who will be involved in all the technical work packages. The INSIGHT project complements the control room and system performance BAU activities.

Strathclyde is requesting total SIF funding of £89,296 in support of their highly complex oscillatory modelling work of WP3 which is the instrumental technical work package of Alpha.

As an end user, NG ESO is requesting £62,569 of SIF funding and will provide technical steer, historical oscillation data and support the maturing of the CBA. NG ESO's understanding of the entire GB transmission network will be paramount in developing a CBA with a greater level of confidence that demonstrates the benefits UK-wide.

The costs submitted in the budget are in full accordance with the terms set out in the UKRI costs guidance. Therefore, these are cost rates without profit that offer more competitive rates than standard industry rates that the partners would apply to commercial work.

Associated Innovation Projects

- ○ Yes (Please remember to upload all required documentation)
- ◉ No

Supporting documents

File Upload

INSIGHT Alpha Phase Poster - Final.pdf - 479.9 KB
INSIGHT Alpha - Show and Tell 2024-04-22.pdf - 1.3 MB
INSIGHT Alpha - End of Phase Meeting 2024-04-11.pdf - 3.4 MB
SIF Alpha Round 2 Project Registration 2023-11-14 11_35 - 79.4 KB

Documents uploaded where applicable?

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