ESIG AoI

Initial Engagement Workshop

A trial run with Catapult staff, using Project LEO as a worked example. Held on 3rd October 2019

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1. Executive summary

Energy Systems Catapult

Energy Systems Catapult was set up to accelerate the transformation of the UK's energy system and ensure UK businesses and consumers capture the opportunities of clean growth.

The Catapult is an independent, not-for-profit centre of excellence that bridges the gap between industry, government, academia and research.

We take a whole system view of the energy sector, helping us to identify and address innovation priorities and market barriers, to decarbonise the energy system at the lowest cost.

ERIS and ESIG engagement with 'Prospering from the Energy Revolution' Demonstrator Projects

The Catapult's ERIS programme has started its engagement with the Demonstrator Projects, which are funded by Innovate UK as part of the Prospering from the Energy Revolution programme.

The Catapult's ESIG capability has been developing its Framework to support the Concept and Demonstrator Projects. The main stages for this Framework are Initial Engagement, Discovery, Analysis, and Design – although the last three are the proposed stages but will be entirely dependent on what the projects need and where they are in their lifecycle.

Trial of the ESIG AoI Capability

A trial run-through of the Initial Engagement stage of the AoI Capability was carried out in during September and October 2019. It was based on the LEO project, and held with internal Catapult staff who acted as representatives from the LEO consortium members.

This report concludes the Initial Engagement process and, in this instance, contains both the typical information that would be provided to a client project, and additional lessons for the further improvement of this capability.

Key findings from the trial

<u>It was a successful trial of the approach</u>

- Well prepared & well thought out concept, presentation and exercises
- Prompted enthusiastic debate between different Catapult teams, and pulled together lots of disciplines
- Generated good learning for the Catapult
- Energy System View / Architecture & Exercise A prompted structured discussion between consortium members, about integrating the solution, is one of the main aims of the exercise.
- Aspects of Integration Risks & Exercise B encouraged the participants to consider all Aspects of their points of integration (i.e. not just technical but also legal, data, operations etc). It was a rounded and thought-provoking exercise, and likely to identify many new risks.
- Solution Maturity & Exercise C gave a useful matrix of definitions of readiness for each aspect. Readiness level 'Poker' is a good way of getting individual opinions out, then having a productive discussion to draw out reasons and assumptions. Continue to use this approach for both the overarching and detailed Readiness Levels.

<u>Better communication of the approach, options and benefits is required</u>

- ESIG now needs to improve the sales pitch, giving better communication of approach and benefits, and communicating where ESIG and the Initial Engagement fits into the bigger picture; the project lifecycle & other Catapult capabilities & where to go elsewhere for support.
- Explain that ESIG AoI is specifically about integration, rather than whole system design.

- Note this is a journey; the initial engagement aims to get key concepts for systems integration across and identify some key issues to address. It is not a substitute for full systems architecture development.

Important to engage with the project and understand its issues and priorities so ESIG can tailor the workshop.

Must have key people at the workshop

- Stakeholder mapping is required before the workshop.
- Each consortium member should send their project manager & solution architect
- Ensure someone is able and willing to represent the interests of external groups affected by the system. E.g. Consumers, communities, vulnerable people, etc

Important to do thorough preparation to understand and capture the project's architecture

- It was possible to create a good AoI-WES architecture based on high level / conceptual diagrams provided be the project and a good deal of research of consortium member websites. However to be of most use in the workshop, this should be reviewed by the project first.
- Further work should be carried out to refine the architectural approach and to test it more widely amongst industry people interested in the energy system transformation.
- Bring in more system of systems thinking (i.e. the system of interest, the management of the transformation, and the learning about both the system and the management)

Further development of the AoI-WES Architecture method would help projects consider new energy systems and deliver valuable new services

- One improvement could be to further refine the WES Functions by considering them as Value Streams and as a Value Ecosystem. Repeat the process for other projects, to further challenge and refine the architecture framework.
- Whole system design does need looking at, and the Catapult could further develop its capabilities and offerings in this area.
- Innovate UK could further specify the sort of architectural information required of the projects. The Catapult could further develop an internal architecture capability and framework, to encourage a consistent approach to energy systems architecture. The AoI-WES architecture framework could be a good starting point, or contribution, for this.

2. Introduction

The Catapult's ERIS programme has started its engagement with the Demonstrator Projects, which are funded by Innovate UK as part of the Prospering from the Energy Revolution programme.

The Catapult's ESIG capability has been developing its Framework to support the Concept and Demonstrator Projects. The main stages for this Framework are Initial Engagement, Discovery, Analysis, and Design – although the last three are the proposed stages but will be entirely dependent on what the projects need and where they are in their lifecycle.

A trial run-through of the Initial Engagement capability was carried out in during September and October 2019. It was based on the LEO project, and held with internal Catapult staff who acted representatives from the LEO consortium members.

This report concludes the Initial Engagement process and, in this instance, contains both the typical information that would be provided to a client project, and additional lessons for the further improvement of this capability. The report is structured as follows;

- Introduction
    - A brief reminder of the overall ESIG Framework
    - Summary of the stages involved in the ESIG Initial Engagement
- The findings from each stage, and from the four sessions within the workshop
- The recommendations and next steps

2.1. The ESIG Initial Engagement

The aim is introduce a project to the key concepts in Energy Systems Integration, to help them generate valuable insights for the improvement and de-risking of their solution, and to act as a firm basis for any further engagements.

An Initial Engagement would be requested by a project following the 2-day kick-off session, whereby the Catapult's services had been explained. Potentially further detailed discussions with the project would be required to understand their needs.

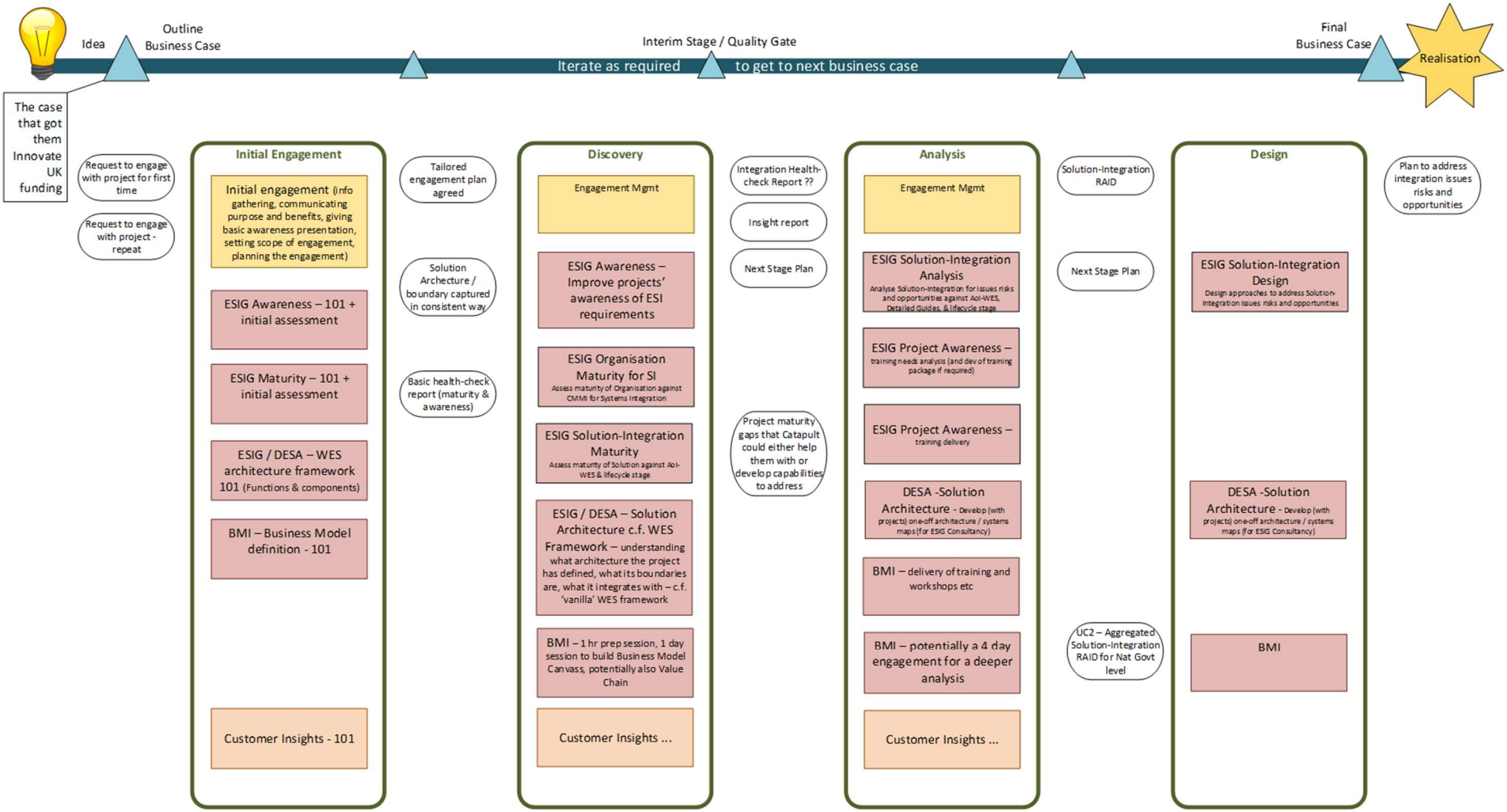
The stages within the ESIG Initial Engagement are as follows;

1. Preparation of the AoI-WES Architecture diagram, based on review of project documentation and any publically available information on the project or its consortium members.
2. Selection and preparation of attendees
3. Detailed arrangements (location, date, rooms & facilities, printouts)
4. Running the workshop

NB: other Catapult capabilities may be engaged by the project in parallel with this process, e.g. Business Modelling, etc.

2.2. The Overall ESIG Framework

The Initial Engagement Workshop is the first part of the support the Catapult can provide to the projects. The trial included the ESIG capabilities (in pink) shown in the first column below;



3. Findings from the Stages and the Workshop

3.1. Preparation of the AoI-WES Architecture diagram

The aim of this stage is to create a view of project's solution, using the ESIG AoI-WES notation, sufficient for the workshop. Key success criteria are;

- Have all the organisations involved been represented? The consortium members and other key stakeholders, i.e. those that the solution provides something valuable to, or from whom the consortium receives value.
- Are the main Functions listed? E.g. 'generate electricity', 'trade flexibility'
- Are the key assets / Components listed? E.g. 'local hydro power station', 'trading platform'
- Are the key integration lines shown?
- Does it represent the best knowledge about the solution, gained by the Catapult so far?

The ERIS team shared a number of documents provided by the LEO Project, relating to the solution. See Appendix.

Various websites were reviewed for more specific information about the consortium members, the services they provide, and the projects they are involved in. This information was used to clarify or help interpret the project's documentation. See Appendix.

A diagram was created in Visio, based on the above information.

In a real engagement, this diagram would be shared and discussed with consortium members, to refine it prior to the workshop.

No.	Finding	Recommendation
1	Projects produced a range of different documents, according to their own needs. There is naturally little consistency between projects on the structure and nature of the information contained in the documents shared with the Catapult.	**Innovate UK could further specify the sort of architectural information required.** **The Catapult could further develop an architecture capability and framework, to encourage a consistent approach to energy systems architecture. The AoI-WES architecture framework could be a good starting point, or contribution, for this.**
2	The descriptions of the projects' solutions were at different levels of detail, and had often been simplified for presentational purposes. Also the notation varied widely. Thus the information provided was open to misinterpretation.	Seek publically available information on the consortium members; what services or products they provide and to whom, their history, the projects they are involved in and particularly the PFER-funded one. Ideally, speak directly with each member organisation about how their part of the solution works and how it fits into the wider solution. Ask for any additional information, diagrams, etc.
3	The process of re-describing the project's solution using the AoI-WES architecture framework, identified new Components to include. It also highlighted the need to focus on the functions that particularly add value to the system of interest being explored in the workshop.	**Further refine the WES Functions by considering them as Value Streams and as a Value Ecosystem.** **Repeat the process for other projects, to further challenge and refine the architecture framework.**

3.2. Selection and preparation of attendees

The aim is to ensure that the right people are able to attend, and that they are prepared to play an active part in the workshop. For a successful workshop, the key people are;

- Overall programme manager
- Overall solution architect (if such exists)
- Representation from each of the Consortium member organisations; any of the following; solution owner/sponsor, project manager, or solution architect

The attendees are listed in Appendix. *For the trial workshop, the ERIS team selected people from a range of different Catapult disciplines, some of whom were familiar with the ESIG Framework. They were given roles and interests, and briefed on the LEO project.*

No.	Finding	Recommendation
1	Identifying and convincing the right people to attend may not be straightforward	Catapult needs to understand the project's conflicting priorities, constraints and plan. The benefits of the AoI framework must be clearly communicated.

3.3. Detailed arrangements (location, date, rooms & facilities, supporting material & printouts)

The administrative side;

No.	Finding	Recommendation
1	Finding a common time in attendees' diaries proved difficult, and this pushed back the date by a month or so.	Identify a time when regular consortium meetings are held, and explore whether a 4 hour workshop can be added. Acknowledge that the workshop must be planned long in advance.
2	A sizable room is required with a large table to accommodate the diagram and to enable the people to move around, have discussions, and scribble amendments.	The location of the workshop must accommodate this, however this may not always by possible, so discuss layouts in advance and adapt as required.

3.4. Running the workshop

3.4.1. The structure

The workshop was held at Catapult office, on 3rd October 2019. The slide deck used is attached in Appendix. The agenda and planned timings are shown below.

The agenda items in pink were the ones specifically about the operation of this workshop as a trial run-though of the approach.

The timings were adapted part way through, to allow for the Catapult's greater interest in the architecture and risk exercises, and to reduce the time spent on organisational maturity given that this was harder to do without people from the real LEO project.

- 09:00 Introductions
- 09:10 Intro to the session – what we need to learn, your roles
- **09:25 Workshop Intro**

- **09:30 Energy System View / Architecture & Exercise A**
- 10:10 Quick Feedback
- **10:15 Aspects of Integration & Exercise B**
- 10.55 Quick Feedback
- **11:00 Break**
- **11:15 Solution Maturity & Exercise C**
- 11:55 Quick Feedback
- **12:00 Organisation Maturity & Exercise E**
- 12:45 Quick Feedback
- 12:50 Discussion of overall impressions and next steps

3.4.2. The workshop overall

Overall the workshop met its aims and was very well received. There was lots of very active participation and some very good discussions. The feedback sessions at the end of each activity generated lots of comments, which were grouped into 'what went well', 'what could be improved'. The exact comments are recorded in a spreadsheet attached in Appendix. They have been summarised in each of the sections below.

3.4.3. Energy System View / Architecture & Exercise A

Generally the exercise went well and it met its objectives; there was good engagement and discussion, the architecture was fleshed out and lines of integration identified. It came as a revelation to one participant that we could talk about the architecture of a smart energy system without having to discuss the physical energy flows, i.e. that the other aspects were complex and important.

No.	Finding	Recommendation
	What went well	
1	Well prepared exercise, giving good initial landscape, in a tactile and accessible way	**Continue with this approach: put in the effort beforehand to create as complete and accurate an architecture as possible.**
2	Good discussion initiated especially between apparently unrelated groups, revealing conflicts, gaps and trade-offs	**Continue with this approach: promoting structured discussion between consortium members, about integrating the solution, is one of the main aims of the exercise.**
	What needs improvement	
3	Need to facilitate the conversations & connections during the exercise	Improve the approach: structure the interaction so that there is time for people to swap around, observe and help steer conversations to ensure exercise is followed also to clear up confusion early.
4	What needs improvement: Limited time to fully explore and capture the system, conflicts, gaps, etc	**Accept and explain: this exercise is not intended as a replacement for a longer, more comprehensive period of systems analysis and design. However it should get people to realise the importance of a whole systems approach to architecting their solutions.**
5	What needs improvement: This paper exercise has its limitations; not easy to rearrange without	Accept and explain: this is a taster session to get the concepts across, as well as an opportunity to identify likely key integration risks and issues.

	breaking links, difficult to fit on the table, can take a while to build initial version	
6	What needs improvement: Capture who talked to whom, and identify any areas not covered	Improve: it may be difficult to capture who talked to whom as facilitators, but explore whether to keep notes or to get participants to list conversations. Will need name tags.

3.4.4. Aspects of Integration & Exercise B

No.	Finding	Recommendation
	What went well	
1	Really good structured way of exploring integration risk, with opposite parties discussing each aspect	**Continue: to consider each Aspect for each integration line, for an initial exploration of integration risk**
	What needs improvement	
	Business Model described as how you make money - the financial model. Where is consideration of customer value proposition that underpins this?	Improve: Update description of the business model to include the customer value proposition, in both the exercises and the AoI Definition .ppt
	This exercise focusses on integration risks against current system structure. It does not question that system structure, nor capture risks across the whole system	**Accept and explain: ESIG AoI is specifically about integration, rather than whole system design. Agree that the latter does need looking at, and that the Catapult could further develop its capabilities and offerings in this area.**
	Explain the Aspects better, then look at each Aspect individually using crib sheets	Improve: description in exercises and in AoI Definition .ppt
	Needs more facilitation to ensure good understanding and to guide the conversations throughout the exercise	Improve: add tips to the exercises re how to guide and facilitate the conversations
	We didn't then disseminate our views back to the group (as we did in Exercise A)	Improve: add in time to feedback findings at eh end of the exercise.
	Presentation perhaps too wordy / hard to engage with	Consider: People have different learning styles, consider how to address this in Definition .ppt versus the exercises.
	What to see in future	
	This exercise may surface conflicts, which is useful if handled constructively	Improve: Include conflict resolution tips in the exercises
	Business Model Canvass - overlap with exercise A	Improve: make more specific reference to the Catapult's Business Model Canvass capability
	Try to ensure all aspects are covered and captured for each integration line, and their risks also (perhaps an Aspects template to fill in?)	Consider: ways to ensure all aspects are covered and captured for each integration line, and their risks also (perhaps an Aspects template to fill in?)
	Ensure someone represents the interests of external groups affected by the system	**Improve: When arranging the workshop, ensure someone is able and willing to represent the interests of external groups affected by the system**

	Explain the Aspects better, then look at each Aspect individually using crib sheets	

3.4.5. Solution Maturity & Exercise C

No.	Finding	Recommendation
	What went well	
1	Useful matrix of definitions of readiness for each aspect	**Continue: to use this approach, for both the overarching and detailed Readiness Levels**
2	Readiness level 'Poker' a good way of getting individual opinions out, then having a productive discussion to draw out reasons and assumptions	**Continue: to use readiness levels 'poker'**
	What needs improvement	
3	There are many words in the RL matrix - simplify	Consider: strike the right balance between brevity, for speed of use during a workshop, and a decent description of what is a fairly broad subject
4	A lot of the value here comes from discussion after each round of voting. Emphasising that in the introduction could encourage that & help where real differences of opinion arise.	Improve: add to exercise slide a note that the value arises in discussing differences of opinion about RLs
5	Add full description to Commercial / Org - Business Model, Op Model, Commercial Model (missing) NB (commercial model drives business model)	Improve: Add full description to Commercial / Org - Business Model, Op Model, Commercial Model (missing) NB (commercial model drives business model)
6	Need to maintain clarity between whole system & participant integration maturity - The discussion was OK but meandered between the two = facilitation role	Improve: add to exercise tips – maintain clarity between whole system & participant integration maturity
7	Be clear on what capabilities the Catapult offers versus what they can get elsewhere	Improve: Be clear on what capabilities the Catapult offers versus what they can get elsewhere – perhaps on the capability roadmap slide
	What to see in future	
8	Make signposting your other readiness levels clearer (we only did a few)	
9	I have never met a project that uncovered all its risk through an exercise like this - but if it uncovers just one significant risk then it is worth it!	Improvement: add note to slides on value of identifying one or more major gaps, and reasonable coverage of most areas. – Also add to promotional material
10	The AoI product needs an engagement roadmap / use case as the journey is not clear to me. Where are we going and what are my options. Work with Becky to produce glossy sale offering - audiences are project leaders / sponsors	**New Product: The AoI product needs an engagement roadmap / use case, describing where are we going and what are my options. Work with Becky to produce glossy sale offering - audiences are project leaders / sponsors**
11	Be clear on what capabilities the Catapult offers versus what they can get elsewhere	Improvement: Be clear on what capabilities the Catapult offers versus what they can get elsewhere

12	Could develop a useful output highlighting current status vs where should be & agreeing some highlevel actions to fill the gap	Improvement: Include in wrapping up session at end of workshop, and capture in report.
13	Determine which exercises to do based on discussion with the project about their main issues and current needs	**Improvement: Determine which exercises to do based on discussion with the project about their main issues and current needs – during pre-workshop prep stage**
14	Use systems thinking archetypes to help conflict resolution	Improvement: Add systems thinking archetypes to tips for conflict resolution

3.4.6. Organisation Maturity & Exercise E

This exercise was not carried out due to the participants desire to focus more on the earlier exercises.

4. Recommendations and Next Steps

1. Consider how to implement the more strategic recommendations, highlighted in bold in the Findings section and summarised in the Executive Summary, using internal or external resources.
2. Implement the tactical recommendations by updating the ESIG AoI Definition .ppt and the Exercise powerpoints.
3. Apply the AoI approach with the Demo projects, as and when they can be persuaded of the value of doing so.

5. Appendix

Information referred to in Findings

LEO source documentation:

- Project LEO Workpackage Breakdown

Consortium websites:

Workshop attendees

Name	Catapult role	'Project role'
David Liversidge	BMT	ESIG Consultant
Madeline Antill	BMT	ESIG Consultant
Kevin Ball	ESIG	Observer
Jon Friend	ESIG	Observer
Matt Blackmur	ERIS	Work Package 1
Rebecca Lane		Work Package 2
Rebecca Wilkes	Consumer Insights	Work Package 3
Jake Verma	Data	Work Package 4
Jim Lott	ERIS	Work Package 6
Anna Stegman	ERIS	
Eva Gromadzki		
Edward Walker		
Louisa Grocott		
Dr. Rose Chard		
Tom Elliott		
Paul Jordan		
Justina Zvirblyte		
David Wyatt		
Andrew ?	Innovator Support	Additional Observer
David O'Mara	Comms	Additional Observer

Greyed out names were invited; did they attend?

Slide deck used in workshop (click to open);

Energy Systems Integration Guides



Workshop giving an overview of Aspects of Integration, and Solution and Organisation Maturity

David Liversidge & Madeline Antill

Thursday 3rd October 2019

@EnergySysCat LinkedIn

LEO architecture diagram:

ESIG-ExerciseA-LEO-v04.vsdx

Detailed lessons captured on post-it notes during workshop

(See separate spreadsheet: DummyProjWkshp_Feedback_03)