BEng Final Year Project Thesis (Threshold)
Design and Implementation (30%)

Design and Implementation: System Modelling (10%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Methods used maybe overly simplistic and/or not suitable for the intended application.	
Student demonstrates the use of simulation and/or analytical methods to model/design their project and makes an attempt at discussing the limitations. Analysis may be simplistic in application and demonstrate little to no original thought beyond that of reference materials (e.g. software tutorials).	Selected

Rank	Additional Items	Selection
+++	Clear discussion of the limitations and/or trade-offs of the techniques with reference to the project specification, application area, and wider context.	Fully met
+++	The methods / tools / techniques that are used are justified with respect to the project specification, application area, resources, and wider context.	Fully met
++++++	Demonstrate application of the methods / tools / techniques to successfully address the project specifications.	Fully met

Engineering analysis of the required parameters is founded on a rigorous MoSCoW analysis in terms of feature sets guiding implementation. This could have been couched in the literature somewhat deeper since there are other applicaitions for the tracking and time-reversal methods adopted that could have framed the novelty to more advantage - cross-synthesis of audio to video cues is particularly exciting. That said, the articulation and choices made are more than adequate to frame the selections as well suited and to allow robust proof-of-concept demonstrations across much of the target spec.

Design and Implementation: System Development (10%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Development is significantly lacking, and it is clear that little actual effort has been expended on the project.	
Student demonstrates ability to take designed and modelled system into a 'real world' environment (note this may be through an actual build or a further refined simulation). Expected challenges from this process are discussed and compensated for.	Selected

Rank	Additional Items	Selection
+++	The development makes use of bespoke methods, created by the student, to meet the project specifications.	Exceeded
+++	Student has demonstrated competency with a range of tools throughout the development of their project.	Fully met
+++	The development shows a clear progression of their methodology adhering to engineering principles. All changes from the original methodology are both explained and justified well.	Fully met
+++	Clear evidence of sub-system testing to validate individual components before integration.	Fully met

A very clear and well-argued set of developments are eleborated, including the creation of significant back-end infrastructure to allow multi-camera processing at a remote site from a limited-access lab. This considerable achievement was not part of the plan and exhibited resource and persistence to deliver against the requirements. Further, the use of digital comparators to analyse "clicks" by the fish as rapid analogue events treated as digital was a genuinely novel innovation by the student which was impressive to see attacked with such gusto (Fig 13). with more time and reflection a digital signal chain with appropriate filtering might have addressed this better than the analogue attack however this was all student-led and should be applauded.

20488824: Smejko, Jake Supervisor marking

Design and Implementation: Use of literature to support engineering work (10%)

Criteria	Selected?
No use of literature, or unable to meet the next rubric level.	
There is some attempt to reference where supporting material is used but it is unclear what aspects of the project are original work and which are from external material.	
Student makes clear referenced use of sources to support their project development. May be from poor sources or focussing on a single type (e.g. website). IEEE/IET style is, by-in-large, followed correctly.	Selected

Rank	Additional Items	Selection
++++	Student clearly identifies how they have adopted and/or adapted the referenced material to add value to their project.	Most
++	All materials are from high quality sources (e.g. manufacturer, peer reviewed, textbook) and a range of types (datasheets, app notes, tutorials, code samples, etc).	Most
++	Limitations of the referenced sources are considered with respect to the project needs, application area, and specification requirements.	Fully met
++++	Referencing is used consistently throughout the implementation section to support all aspects of project design and development.	Most

There is attention to the literature here, interdiscplinary in terms of fish to electronics, and there is a good underpinning of implemented designs to published work and white papers etc - it is also clear that a bit more reading in places might have led to easier solutions although the creativity on display should not be diminished by this small criticism. There is considerable facilityevident with the computing and data handling aspect, which is very well implemented and documented.

BEng Final Year Project Thesis (Threshold)
Final System Testing and Validation (25%)

Final System Testing and Validation: Specification validation (15%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level. Results are provided with no context.	
Results are not used to validate specification.	
Student captures results from their project and uses these to validate against the specification list. Analysis of results may be rudimentary (e.g. only stating visible features/trends).	Selected

Rank	Additional Items	Selection
++++	Results are compared with expectations which may be from modelling, literature, or component/method performance differences. Pass/fail criteria is given. Unexpected results are explained well with suitable attempt to validate the explanation.	Most
++++	Detailed statistical/quantitative analysis of results are carried out to ensure confidence in accuracy and repeatability.	Fully met
++++	Every point in the specification list is validated successfully. Where specification points are not met there is clear explanation why, with analysis of the impact on the overall functionality/aim of the final system.	Fully met

Strong analysis on the computing and real-time imaging aspect coupled with system integration is throughout. There is also strong attention to sources of noise and analogue signal processing and validation, with clear target metrics if not complete achievement of these it is generally well articulated the reasons for this. In particular the analysis and criticism of the YOLO-based methods is laudable - well caveated and with a clear trajectory into which it may be improved in future development. 3D calibration of orthogonal imaging based localisations was also most impressive to see.

Final System Testing and Validation: Presentation of testing setup and results (10%)

Criteria	Selected?
No results have been presented.	
Some results but the chosen format is unintelligible / confusing.	
Testing setup and results are presented using suitable figure types (image, bar, scatter, pie, etc). These are clear with suitable labels, readable axes and correct units etc.	Selected

Rank	Additional Items	Selection
+++	Use of a range of figure/table types, as appropriate for the data being displayed, with suitable axis scales, units, and labels.	Fully met
+++	Clarity of comparison: highlighting/indication of key aspects and features for further discussion (e.g. subfigures, arrows, circles, etc).	Fully met
+++	Logical ordering of results, structured intuitively with the discussion sections.	Fully met
+++	Testing setup details the test conditions and procedures, with justification.	Fully met

The testing and validation regimes were credible and generally quite exacting to the standards that might be expected. The narrative is mostly chronological, reflecting the linear and iterative development aspects among electronics, physical build, software, and AI. The interplay is nicely managed within the written document to bring together and synthesise among the concepts elaborated.

BEng Final Year Project Thesis (Threshold)
Conclusion (15%)

Conclusion: Consideration of system within the wider context (5%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Student summarises their work but has limited or no discussion of the wider background.	
Student reviews their final system with respect to the wider background. This can include consideration of health & safety, diversity, inclusion, cultural, societal, environmental, and commercial matters, codes of practice, and industry standards.	Selected

Rank	Additional Items	Selection
++++	Detailed considerations are made to how the project would next be developed these include details of resource (cost, time, etc) requirements. This covers both immediate and longer-term developments.	Most
++++	Assessment of the final project demonstrates a strong understanding of how it fits within a wide societal context. Including consideration of health & safety, diversity, inclusion, cultural, societal, environmental, and commercial matters, codes of practice, and industry standards; all as applicable to the project.	Fully met
++++	Summary of the current state of the project including full listing of the status of every specification point and the overall project aim. Where points are not met these are accompanied by a suitable explanation, where everything is met the challenge posed by the project is clearly shown.	Fully met

Detailed drawings (though in pen & paper!) show a direction of travel towards an autonomous device capable of monitoring a single tank in the next generation context. An elaboration of hardware as well as software architecture is proposed that brings new engineering and practical aspects to the fore and merits further discussion among stakeholders. Ethical and societal reflects could have been drawn out beyond the research and immediate stakeholder contexts - particularly the industrial and commercial applications and potential biomedical implications of in-brain imaging within living adult vertebrates could have been argued more strongly.

Conclusion: Reflection on Management (10%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Very limited reflection with no lessons learnt.	
Student will reflect upon the progress of their project in terms of the project management. They must have an included an appendix containing copies of monthly progress review pro-formas, which they refer to. Lessons learnt will be discussed but may be unclear how these would relate to future projects.	Selected

Rank	Additional Items	Selection
++++	Project management skills that have been developed are clearly described in a way that is suitable for future engineering projects.	Fully met
++++	Reflections on progress and any actions undertaken to keep the project on track supported by reference to the review documents.	Most
++++	The success of the risk mitigation strategies are evaluated, with suitable learnings that can be applied to future projects given.	Fully met

Jake has realised through conducting this project the value of a robust plan and record-keeping system in order to drive beyond task-focused work towards delivering chunks of value to the stakeholders. To his credit he has done so, making interdisciplinary impressions in the School of Life Sciences and delivering proof of concept of a potentialy research-valuable piece of tech as well as analytical approach.

BEng Final Year Project Thesis (Threshold)
Quality of Communication (5%)

Quality of Communication: Communication Quality and Overall Completeness of Document (5%)

Criteria	Selected?
No submission or unable to meet the next rubric level.	
The dissertation is incomplete and/or poorly presented or written.	
The dissertation is given as a complete document that would allow another person, with a technical background but unfamiliar with the project, to continue or repeat the work. The overall document follows a suitable layout and has an acceptable presentation with expected document features (section headings, page numbers, contents page).	Selected

Rank	Additional Items	Selection
++++	Consistent use of styles throughout the thesis including headings, page layout, captioning, etc.	Fully met
++++	Inclusion of tables of figures, tables, abbreviations, and symbols where applicable. Correct use of cross -referencing throughout the document.	Fully met
++++	Overall quality of written communication is excellent. Concise with correct grammar, spelling, etc.	Fully met

Strong document with a good narrative thread and which clearly and concisely communicates its intent from context through proof of concept. It makes much of good data and the minor crticicism I would offer is that the images of the fish and samples in tanks are generally poorly lit and suffer from specular reflections and confusing back-drops - it is clear from inspecting among the images that this was realised in the course of the project and that bespoke lighting would have helped the cause in several places. The arc of the learning journey is well described and frankly communicated throughout.

BEng Final Year Project Thesis (Threshold)
[Supervisor Only] Professionalism and Self-Management (25%)

[Supervisor Only] Professionalism and Self-Management: Professionalism and Self-Management (25%)

Criteria	Selected?
Little to no attendance at meetings, no evidence of progress between meetings.	
Student demonstrated limited aspects of self-management during the project and required micromanagement to make progress. Meetings often missed with no notice or explanation.	
Student demonstrated some aspects of self-management during the project and did not require complete micromanagement. Meetings were attended inline with the expectations of the supervisor (including provision of agendas where expected).	Selected

Rank	Additional Items	Selection
++++++++	Purely self-motivated with a consistent high level of effort applied throughout the project.	Fully met
++++	Student has a professional approach to supervisor contact and arrives to meetings prepared to maximise value of time spent.	Most

Jake was very self-directed in delivering his project, developing and applying a multi-disciplinary skill set to surmount obstacles that required software, hardware, and mechanical builds as well as dealing with wet biology and working across locations inside the fish facility. While there were occasional lapses in attendence and record-keeping he satisfied his stakeholders and supervisor by continuing to deliver improvements in his project and workflows throughout the year.

BEng Final Year Project Thesis (Threshold)
Design and Implementation (30%)

Design and Implementation: System Modelling (10%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Methods used maybe overly simplistic and/or not suitable for the intended application.	
Student demonstrates the use of simulation and/or analytical methods to model/design their project and makes an attempt at discussing the limitations. Analysis may be simplistic in application and demonstrate little to no original thought beyond that of reference materials (e.g. software tutorials).	Selected

Rank	Additional Items	Selection
+++	Clear discussion of the limitations and/or trade-offs of the techniques with reference to the project specification, application area, and wider context.	Fully met
+++	The methods / tools / techniques that are used are justified with respect to the project specification, application area, resources, and wider context.	Fully met
++++++	Demonstrate application of the methods / tools / techniques to successfully address the project specifications.	Exceeded

There could have been more justification of the tools used (even when the decisions were "obvious") but overall this is really strong

Design and Implementation: System Development (10%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Development is significantly lacking, and it is clear that little actual effort has been expended on the project.	
Student demonstrates ability to take designed and modelled system into a 'real world' environment (note this may be through an actual build or a further refined simulation). Expected challenges from this process are discussed and compensated for.	Selected

Rank	Additional Items	Selection
+++	The development makes use of bespoke methods, created by the student, to meet the project specifications.	Exceeded
+++	Student has demonstrated competency with a range of tools throughout the development of their project.	Exceeded
+++	The development shows a clear progression of their methodology adhering to engineering principles. All changes from the original methodology are both explained and justified well.	Fully met
+++	Clear evidence of sub-system testing to validate individual components before integration.	Fully met

Jake clearly handled a range of relatively demanding software and other relatex challenges. Its not clear how much support he had but the outcome is impressive

20488824: Smejko, Jake Moderator marking

Design and Implementation: Use of literature to support engineering work (10%)

Criteria	Selected?
No use of literature, or unable to meet the next rubric level.	
There is some attempt to reference where supporting material is used but it is unclear what aspects of the project are original work and which are from external material.	
Student makes clear referenced use of sources to support their project development. May be from poor sources or focussing on a single type (e.g. website). IEEE/IET style is, by-in-large, followed correctly.	Selected

Rank	Additional Items	Selection
++++	Student clearly identifies how they have adopted and/or adapted the referenced material to add value to their project.	Fully met
++	All materials are from high quality sources (e.g. manufacturer, peer reviewed, textbook) and a range of types (datasheets, app notes, tutorials, code samples, etc).	Fully met
++	Limitations of the referenced sources are considered with respect to the project needs, application area, and specification requirements.	Most
++++	Referencing is used consistently throughout the implementation section to support all aspects of project design and development.	Most

Jake had clearly considered the literature when we met but this is onyl partially reflected in this report unfortunately. Overall, though, this is strong.

BEng Final Year Project Thesis (Threshold)
Final System Testing and Validation (25%)

Final System Testing and Validation: Specification validation (15%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level. Results are provided with no context.	
Results are not used to validate specification.	
Student captures results from their project and uses these to validate against the specification list. Analysis of results may be rudimentary (e.g. only stating visible features/trends).	Selected

Rank	Additional Items	Selection
++++	Results are compared with expectations which may be from modelling, literature, or component/method performance differences. Pass/fail criteria is given. Unexpected results are explained well with suitable attempt to validate the explanation.	Fully met
++++	Detailed statistical/quantitative analysis of results are carried out to ensure confidence in accuracy and repeatability.	Fully met
++++	Every point in the specification list is validated successfully. Where specification points are not met there is clear explanation why, with analysis of the impact on the overall functionality/aim of the final system.	Fully met

The project tackled a difficult project in a number of interesting and innovative ways. There could be more linking between the specification and the results

Final System Testing and Validation: Presentation of testing setup and results (10%)

Criteria	Selected?
No results have been presented.	
Some results but the chosen format is unintelligible / confusing.	
Testing setup and results are presented using suitable figure types (image, bar, scatter, pie, etc). These are clear with suitable labels, readable axes and correct units etc.	Selected

Rank	Additional Items	Selection
+++	Use of a range of figure/table types, as appropriate for the data being displayed, with suitable axis scales, units, and labels.	Fully met
+++	Clarity of comparison: highlighting/indication of key aspects and features for further discussion (e.g. subfigures, arrows, circles, etc).	Fully met
+++	Logical ordering of results, structured intuitively with the discussion sections.	Exceeded
+++	Testing setup details the test conditions and procedures, with justification.	Exceeded

Strong presentation clearly explaining some technically difficult challenges. Well done! . . . . . .

BEng Final Year Project Thesis (Threshold)
Conclusion (15%)

Conclusion: Consideration of system within the wider context (5%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Student summarises their work but has limited or no discussion of the wider background.	
Student reviews their final system with respect to the wider background. This can include consideration of health & safety, diversity, inclusion, cultural, societal, environmental, and commercial matters, codes of practice, and industry standards.	Selected

Rank	Additional Items	Selection
++++	Detailed considerations are made to how the project would next be developed these include details of resource (cost, time, etc) requirements. This covers both immediate and longer-term developments.	Fully met
++++	Assessment of the final project demonstrates a strong understanding of how it fits within a wide societal context. Including consideration of health & safety, diversity, inclusion, cultural, societal, environmental, and commercial matters, codes of practice, and industry standards; all as applicable to the project.	Fully met
++++	Summary of the current state of the project including full listing of the status of every specification point and the overall project aim. Where points are not met these are accompanied by a suitable explanation, where everything is met the challenge posed by the project is clearly shown.	Fully met

Engineering-wise, this is a really strong project. The reference to the bigger parts of the scientific research are also important and, while Jake displayedthis in our conversations, it is only partially reflected here

Conclusion: Reflection on Management (10%)

Criteria	Selected?
Section missing, or unable to meet the next rubric level.	
Very limited reflection with no lessons learnt.	
Student will reflect upon the progress of their project in terms of the project management. They must have an included an appendix containing copies of monthly progress review pro-formas, which they refer to. Lessons learnt will be discussed but may be unclear how these would relate to future projects.	Selected

Rank	Additional Items	Selection
++++	Project management skills that have been developed are clearly described in a way that is suitable for future engineering projects.	Fully met
++++	Reflections on progress and any actions undertaken to keep the project on track supported by reference to the review documents.	Fully met
++++	The success of the risk mitigation strategies are evaluated, with suitable learnings that can be applied to future projects given.	Fully met

The project tends towards the "engineering". While the report is strong, I'd suggest future reports looking more at the "softer" side as well.

BEng Final Year Project Thesis (Threshold)
Quality of Communication (5%)

Quality of Communication: Communication Quality and Overall Completeness of Document (5%)

Criteria	Selected?
No submission or unable to meet the next rubric level.	
The dissertation is incomplete and/or poorly presented or written.	
The dissertation is given as a complete document that would allow another person, with a technical background but unfamiliar with the project, to continue or repeat the work. The overall document follows a suitable layout and has an acceptable presentation with expected document features (section headings, page numbers, contents page).	Selected

Rank	Additional Items	Selection
++++	Consistent use of styles throughout the thesis including headings, page layout, captioning, etc.	Fully met
++++	Inclusion of tables of figures, tables, abbreviations, and symbols where applicable. Correct use of cross -referencing throughout the document.	Fully met
++++	Overall quality of written communication is excellent. Concise with correct grammar, spelling, etc.	Fully met

A well presented report clearly explaining some technically demanding topics. . . . . .

BEng Final Year Project Thesis (Threshold)
[Moderator Only] Dissertation Defence (25%)

[Moderator Only] Dissertation Defence: Dissertation Defence (25%)

Criteria	Selected?
Student did not attend, or unable to meet the next rubric level.	
Student is unable to answer simple questions about the project.	
The work of the project (including aim) is well explained with suitable demonstration (e.g. live, video, results discussion) of the final system. Student clearly states which specification points have been met and discusses any deficiencies. Basic questions about the students experience of the project are handled well.	Selected

Rank	Additional Items	Selection
++++	Questions about the project specifics (including methods applied, reasoning, validity of results) are expertly handled.	Exceeded
+++	Questions about their personal development and experience working on the project are expertly handled.	Exceeded
+++	Questions reflecting on their planning process and how the project went are expertly handled.	Exceeded
++	Student gives a high-quality delivery that is confident, enthusiastic, and professional, whilst providing genuine insight into the project work.	Exceeded

Jake has to be one of the most enthusiastic communicators/ advocates for a project I've seen. Jake really sold the prohect, both technically and scientifically. Well done!