Sensing Technology Solutions for Environmental Monitoring and Waste Streams Characterisation

Submission Guidelines

Introduction

This provides a guide to submitting, including definitions of Technology Readiness Levels (TRL)

All submissions should be via the form on the Rio Tinto Pioneer Portal, which has a number of questions. In addition please summarise as a concept paper and feel free to provide a video supporting.

We encourage you to include as much evidence as possible to support the claims made in your submission, to provide us with confidence in the feasibility and effectiveness of your solution or concept.

Concept Paper Requirements

Applicants must submit their concept paper using the template on the following page to Rio Tinto directly via the Rio Tinto Pioneer Portal.

The concept paper must be submitted in Adobe PDF format and must not exceed four (4) pages, including all charts, images etc, but excluding references.

All pages must be formatted to A4 paper with margins not less than one inch on every side. Use black Arial font size of 11-point or larger (except in Figures or tables, which may be 10-point font). A symbol may be used to insert Greek letters or special characters, but the font size requirement still applies. Line spacing should not be less than single-spaced. The lead technical point-of-contact's last and first name and the lead organisation's name should appear in the upper right corner of the header of every page ("Last Name, First Name; Org"; Example: Smith, Jane; University of State). Page numbers must be included in the footer of every page.

The concept paper must be named as follows:

Enviromonitoring&wastecharacterisation_(Lead Organisation name)_Concept Paper.pdf

The name of the Lead Organisation and Principal Investigator's last name shall be included on each page header.

The following information shall be inserted on top of the first page:

PROJECT TITLE
Lead Organisation (City, State), Principal Investigator Name

Total Project Cost (% Cost Share by Proponent)
Project Duration

Executive Summary (Max. 150 words)
Briefly summarise (1) Areas of Interest (AoIs)the project will address and why it is important; (2) the expected outcomes; and (3) the potential broad impact.

Project Description (Max. 1 ½ page)
Concisely describe your research project, answering the following questions:

- What is your project? Please provide a clear and concise description
- How will it address the use case and advance a solution?
- What are the key research objectives and deliverables upon completion of the project?
- What Technology Readiness Level does the project seek to achieve?
- What is the Techno-economic Approach (TEA) that will be applied and how will the project impacts be assessed throughout the duration of the project.
- What are the wider societal and environmental benefits (if any)?

Tell us what the solution does (NOT how it does it) and why it matters in the context of the area/s of interest.

Project Value Proposition (Max. 1 ½ page)
Why should Rio Tinto go ahead with this project? What are the existing and emerging competing solutions (current state-of-the-art) and how is this an improvement on both? How is it innovative? In what way could Rio Tinto benefit from using your proposed technological approach? For example, improves process control, reduces risks to remote worker as well as operational burden and/or allow Rio Tinto to categorise waste rock for valorisation potential.

Please state the Technology Readiness level for your solution (Please consider that TRL 9 is only applicable if proven and commercialised at full scale on mining environments) and explain on why you selected this TRL level? Please elaborate on how advanced the technology is in the development process, from concept to full development. What has been done so far? What is its applicability in the context of mining?

Project Resourcing (Max. 1/2 page)

Please provide a summary of estimated project budget breakdown including the project timeframe (per year and by consortium member if applicable) for equipment or further research, site requirements / facilities needed.

Please provide details of how much funding is already available (i.e. self-supported or from current grants) and how much is required from Rio Tinto.

Please provide details of the Project team, capabilities, and role of each member in the Project.

Solution Implementation (Max. 1/2 page)

What is your overall vision for implementing the technology solution? What type of environment would it be located in?

What supporting technologies are required (e.g., installation platform, communications system, data storage)?

References

Please provide a list of relevant references

Technology Readiness Levels (TRL) Definitions

Technology Readiness Levels		Description	Supporting Information
1	Basic principles observed and reported	Scientific knowledge generated begins translation to applied R&D.	Peer review published research identifies the principles that underlie this concept.
2	Technology concept and/or application formulated	Invention begins, practical application is identified but is speculative, no experimental proof or detailed analysis is available to support the conjecture.	Publications or other references that address the feasibility and benefit of the concept, as well as the application being considered.
3	Analytical and experimental critical function and/or characteristic proof of concept	Active R&D initiated in appropriate context, including components that are non-integrated (physical validation of analytical predictions in laboratory).	Results of laboratory tests performed to measure parameters of interest and comparison to analytical predictions for critical subsystems. Confirm technology concept has firm scientific underpinning. References to who, where, and when these tests and comparisons were performed.
4	Component and/or breadboard validation in laboratory environment (or Alpha Prototype component)	Basic technological (hardware and/or software) components are integrated to establish they will work together in a low fidelity system and performance predictions are defined.	System integration concepts that have been considered and results from component and/or breadboard testing. References to who did this work and when. Details of how breadboard hardware and test results differ from the expected system goals.
5	Components and/or breadboard validation in relevant environment (semi-integrated system)	Technology system/ components tested in a simulated environment using real world fluids, data or setpoints to demonstrate overall performance.	Results from testing technology are integrated with other supporting elements in a simulated, high-fidelity operational environment. How does the “relevant environment” differ from the expected operational environment? How do the test results compare with expectations? What problems, if any, were encountered? What will be the scaling requirements?

Technology Readiness Levels		Description	Supporting Information
6	System/sub-system prototype demonstration/ verification in a relevant environment	Prototype evaluation in a high-fidelity, simulated laboratory operational environment under critical environmental conditions	Results from laboratory testing of a prototype system that is near the desired configuration in terms of performance, weight, and volume. How did the test environment differ from the operational environment? Who performed the tests? How did the test compare with expectations? What problems, if any, were encountered? What are/were the plans, options, or actions to resolve problems before moving to the next level?
7	System prototype demonstration in an operational environment (beta prototype system level)	Whole system prototype evaluation in relevant operational environment	Results from testing a prototype system in an operational environment. Who performed the tests? How did the test compare with expectations? What problems, if any, were encountered? What are/were the plans, options, or actions to resolve problems before moving to the next level?
8	Actual system completed and qualified through test and demonstration (pre-commercial demonstration)	Final phase of technology development; validation of technical performance and compliance with design specifications (Initial commercial trials). In almost all cases, this TRL represents the end of the true system development	Results of testing the system in its final configuration under the expected range of environmental conditions in which it will be expected to operate. Assessment of whether it will meet its operational requirements. What problems, if any, were encountered? What are/were the plans, options, or actions to resolve problems before finalizing the design?
9	Actual system proven through successful operations	Actual commercial application of the technology in its final form and under real world conditions (commercial trials).	Operational commissioning reports.