

HS2 Accelerator 6.0

Challenge Specification



Challenge Statements

Accelerating Design

How can we rapidly explore design possibilities and adapt designs to evolving project requirements and site-specific constraints?

In the dynamic landscape of construction, the demand for rapid design solutions driven by robust data is more critical than ever. We are calling for innovative technologies that harness data-driven approaches to expedite the design phase of construction projects.

We are seeking solutions that could:

- automate design generation based on project requirements and constraints, to enable rapid exploration of various design possibilities.
- harness artificial intelligence to optimise designs by analysing historical data, predicting potential issues, and suggesting enhancements for efficiency and sustainability.
- allow seamless communication and information-sharing among interdisciplinary stakeholders, including architects, engineers, and contractors, to foster a unified and efficient design workflow.

How can we standardise design to promote consistency, efficiency, and excellence across construction projects?

In the construction industry, there is a lack of standardisation which means that designs are made in silos, often from scratch by different contractors, resulting in duplicated effort and inefficiencies.

We are seeking innovative solutions that can support the standardisation of design to streamline inefficiencies, prevent duplicated efforts, and ensure a consistent and high-quality process which can be replicated across diverse construction projects.

We are seeking solutions that could:

- develop universal design configurations that can be easily iterated upon and reused across projects, establishing a standardised library of design elements.

- exchange design knowledge, project learnings and best practice across interdisciplinary stakeholders including architects, engineers, and contractors.
- integrate industry standards, codes, and regulations directly into the design process, ensuring that designs are inherently compliant and reducing the need for manual checks.

Automating Handover

How can we efficiently and accurately verify as-built assets to their approved designs?

Ensuring that constructed assets align to their approved designs is a critical aspect of quality control in the construction industry. The current methods of as-built verification often involve labour-intensive inspections and can be susceptible to human error or oversight. We seek innovative technologies that can provide robust digital assurance, confirming that the as-built assets adhere to the approved designs.

We are seeking solutions that could:

- automate how as-built assets are verified during handover, including the review of contractual documentation, non-compliance reports and approved design specifications.
- integrate machine learning algorithms to detect deviations from contractual and design specifications, improving the accuracy and speed of the assurance process.

How can we automate and streamline the management, review, and approval of documentation during handover?

Handover in large infrastructure projects is a critical phase, which requires meticulous management, review, and approval of documentation. Information is provided in diverse formats which are often unstructured – this could range from engineering drawings, to handwritten forms and PDF reports, to risk registers. We are seeking solutions that can automate the current manual processes which are labour-intensive and inefficient, resulting in bottlenecks and delays to approvals.

We are seeking solutions that could:

- automatically review documentation to ensure completeness, accuracy, and compliance.

- harness machine learning algorithms to capture and interpret diverse unstructured datasets, including drawings and handwritten documents.
- interpret hundreds of thousands of unstructured data points to recognise patterns and identify missing information, conflicts, and duplication.

Reducing Waste

How can we adopt a more circular approach to deconstruction and disassembly?

HS2 has over 350 active sites spanning across the West Midlands and London, undertaking various tasks from tunnel ring prefabrication to viaduct pillar construction. Upon completion of construction, these sites and storage yards need to be safely, efficiently, and sustainably removed.

HS2 is committed to diverting 95% of construction and demolition material from landfill as part of its environmental goals, and improving the deconstruction process is a significant challenge requiring data from multiple contractors. Contractors currently collect data about temporary assets in different formats, stored in various locations, which can hinder data-driven decision-making.

We are seeking solutions that could:

- streamline the collection and analysis of deconstruction and disassembly data to enable optioneering for effective waste management.
- provide data-driven recommendations using carbon lifecycle assessments and cost to support decision-making for disposal options.
- identify opportunities for disassembled assets and materials to be reused or repurposed, considering factors such as, value of component materials, quantity of assets and component materials, geographic location, deconstruction schedule, lifecycle assessment, and permits & consents.

Contact Details

If you have any questions about the programme, please contact Jasmine Pollock, Accelerator Programme Manager [here](#).