Innovation in Digital Engineering – Automotive Sector
IDEAS Round 3 | Call for Collaboration

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Summary

The Hartree National Centre for Digital Innovation (HNCDI) partners, STFC and IBM Research, in cooperation with the Advanced Propulsion Centre (APC) solicit proposals for HNCDI projects through this Innovation in Digital Engineering – Automotive Sector (IDEAS) Round 3 Call Programme from automotive and related business supplying automotive sector. HNCDI is a collaborative programme between STFC Hartree Centre and IBM Research which will enable businesses to acquire the skills, knowledge, and technical capability required to adopt emerging digital technologies including supercomputing, data analytics, artificial intelligence (AI), and quantum computing. HNCDI will provide a safe and supportive environment for organisations to explore the latest digital technologies and skills, develop proofs-of-concept, and create roadmaps to apply them to industry and public sector challenges effectively. This Automotive Sector Call Programme seeks in collaboration with automotive and related automotive suppliers to create HNCDI projects that apply these emerging digital technologies of AI, hybrid and multi-cloud, high performance computing (HPC), and quantum computing to advance the automotive sector's digital capabilities, accelerate scientific and engineering discovery, and enable productivity growth and global competitiveness of the UK automotive sector.

Call outline

As part of HNCDI, STFC and IBM Research are working closely with the APC to develop the IDEAS Round 3 Call, a programme of coordinated digital automotive sector projects on the themes **Design & Development** and **Sustainable Supply Chain & Production**. The aim is to apply new methods and tools, and de-risk the uptake of new technologies in the automotive industry. The projects will validate the new technologies capabilities as applied to key automotive sector challenges. Through these projects new avenues for additional research and develop of these and other new technologies may be uncovered.

As a result, we are seeking proposals from the industry to turn into a series of projects, which demonstrate primary use of new digital technologies required to address a specific challenge in the automotive sector.

The IDEAS Round 3 competition is offering up to **72 months of staff time** (combined from STFC and IBM resources) and **compute resources** to enable the initiation of up to **8 projects** (minimum 4 projects) to commence between November 2024 to January 2025 (and conclude by January 2026). This corresponds to an allocation of approximately **£2-3 M** of the total HNCDI budget (£210m) that will fund STFC and IBM staff time and cloud/computing access. No direct funding is available to organisations outside of the HNCDI partners.

Scope

The IDEAS Round 3 Call programme is intended for UK industries working in or with the automotive sector, through access to advanced digital technologies and supporting expertise, to help apply next generation digital methods and tools to overcome challenges in engineering, manufacturing, or operation which have a high impact on UK automotive productivity.

We are seeking project proposals that will combine newly researched and developed digital technologies and existing digital technologies, improving speed, accuracy, and efficiency of solutions within logistics, engineering, manufacturing, and end-of-life.

The IDEAS Round 3 Call suggested focus is on the following themes:

- **Design & Development**
- **Sustainable Supply Chain & Production**

After choosing one of the above themes, the applicable technology areas for consideration can include the following. However, exact specification of digital technologies applied to solve the application challenge will be decided in collaboration in Stage 2.

- **AI ENHANCED MODELLING & SIMULATION** | accelerating discovery and innovation through AI enriched large-scale, multi-disciplinary, coupled computational modelling & simulation. Providing targeted and faster results through the application of AI techniques to modelling & simulation applications.

- **AI ENHANCED DATA ANALYTICS** | exploration of engineering and processes through automated data interpretation, identification of insights discoverable only through advanced AI analytics, and making increasingly valuable predictions based on the data. Enabling concepts that push boundaries of what is possible to develop safer, more efficient, and more innovative products and processes.

- **SCALABLE ARTIFICAL INTELLIGENCE** | enabling the application of AI algorithms and solutions to operate at the size, speed, and complexity required to deliver effective operational capabilities. Providing advanced insights from a wealth of knowledge greater than that of an individual or team.

- **EXASCALE COMPUTING** | empowering the capability to tackle challenges in scientific discovery, manufacturing research and development, physical simulations, and aerodynamics at levels of complexity and performance that previously were out of reach.

- **QUANTUM COMPUTING** | exploiting the laws of quantum mechanics to solve problems that are too complex for classical computing and exploring how emerging digital technologies can offer next generation of competitive advantages. Developing quantum computing approaches to in-depth simulations, complex multi-dimensional optimization challenges, and enabling material discovery.

The following is a list of example projects that are suitable for this call for collaboration:

- **Design & Development**
    - Material discovery for battery and fuel cell applications
    - Material discovery for lightweighting
    - Life cycle analysis and optimisation
    - Modelling and simulation for design optimisation
    - In-silico testing and validation

- Digital twin for product

- **Sustainable Supply Chain & Production**
  - Condition monitoring
  - Energy optimisation
  - Recyclable materials
  - Digital twin for supply chain and manufacturing
  - Process optimisation – reducation of cycle time and waste material, quality control, defect detection
  - Logistics modelling
  - In-service monitoring

Support type and expected outcomes

The Automotive Sector Call programme will fund all STFC and IBM staff and compute resources. No direct funding is available to organisations outside of the HNCDI partners.

Most projects are anticipated to fall in the **6-12-month** timeframe, with maximum project duration being fixed at 12 months.

We are looking for committed partners and as such in kind contribution is expected but no fixed amount is specified. In kind covers data, staff effort, materials to test the new technologies, and time taken in testing the developed solution and providing continuous feedback.

During projects, we expect to use the digital technologies being researched and developed by STFC and IBM Research. Within the projects new areas of research and development may be required to address the automotive sector challenge. It is hoped that any digital tools or platforms either developed or applied within a project should demonstrate a **Technology Readiness Level** of **3 to 7 by the end of the project**.

For successful proposals in the IDEAS Round 3 Call, you will receive:

1. Dedicated resource from the HNCDI partners for projects aiming to collectively address your challenge.
2. The ability to collaborate with the STFC Hartree Centre and IBM Research – home to world-leading science facilities and knowledge, supported by the sector knowledge embedded in the APC.
3. De-risking innovation by providing access to a supportive environment and the ability to test new digital concepts and technologies.

Training in digital technologies is offered under HNCDI and you will be advised which of our available training courses would be suitable for you to enable the most effective understanding and use of the technologies used within the projects.

Due to the nature of the support, the digital assets themselves developed during the course of the project will be owned by HNCDI. Industry participants can expect to receive outputs from the projects including reports on the work carried out and associated results, models, algorithms and a

software evaluation to **trial the developed methods/technologies** (the evaluation period term is negotiable and formalized in a legal agreement, for further details please contact the IDEAS team).

Eligibility

To be eligible for participation to the submission and project delivery phases, your organisation **must**:

- Be a UK based business of any size registered at Companies House;
- Have an engineering or manufacturing base for the relevant product in the UK or provide the relevant product or service from or in the UK;
- If "in kind contribution" is provided, carry out its project work in the UK;
- Intend to exploit the results from or in the UK;
- Start the project in the window between 1st November 2024 to 31st January 2025.
- End the project no later than 31st January 2026.

Application process

The application process for this call has **two stages**.

i) **Stage 1. Expression of Interest (EOI) | DEADLINE 4th JUNE 2024**
The initial application process requires companies to submit a concise Expression Of Interest Form (shown in Appendix D), describing the area of focus.

Companies are not required to describe the project they want to do; instead, they will need to describe the challenge, its nature, any techniques already tried and the value of solving it.

In addition, the application should include some assessment of how solving the challenge would benefit sales and other business outcomes, as well as the contribution that the company would like to provide (in-kind).

This application will be assessed by a board comprising members from STFC, IBM, and APC against the selection criteria.

The submission of an EOI is a pre-requisite for participation in the full project proposal, but it does not guarantee that a future proposal derived from it will be chosen.

Submissions should be sent to hartreecentre@stfc.ac.uk by midnight of the 4th JUNE 2024.

ii) **Stage 2. Full Project Proposal | DEADLINE 1st NOVEMBER 2024** (although project proposals ready before this date will be evaluated and will commence earlier – from the earliest of September 2024). For approved Expression Of Interests, the next stage is the development of a Full Project Proposal in which the companies that have been successful in 'Stage1. Expression of Interest' will work with the HNCDI staff. Although input information is required from the successful company, it is expected that the HNCDI

staff will be leading the 'Full Project Proposal' activities such as detailed scoping of work packages and project risks.

In this stage specifics of the work to be done and further technical details will be addressed.

The 'Full Project Proposal' will then be reviewed by the HNCDI Management Board for final approval or rejection.

During each stage, the Automotive Sector Call team will be offering an interactive consultancy service on a 1:1 basis to assist participants developing their proposal.

Selection Criteria

The 'Stage 1. Expression of Interests' are evaluated by the Automotive Sector Call Advisory Board, which comprises a minimum of 8 members:

- Head of Technology Trends – APC or an alternative nominated by APC;
- Head of Business Development – APC or an alternative nominated by APC;
- The STFC Automotive Lead or an alternative STFC Automotive Sector Team representative;
- The STFC Automotive Business Development Manager or an alternative STFC Business Development Manager representative;
- The STFC HNDCI Explore Workstream Lead or an alternative STFC contact nominated by the STFC Management Board;
- The IBM HNDCI Explore Workstream Lead or an alternative IBM contact nominated by the IBM Management Board;
- The STFC HNDCI Excelerate Workstream Lead or an alternative STFC contact nominated by the STFC Management Board;
- The IBM HNDCI Excelerate Workstream Lead or an alternative IBM contact nominated by the IBM Management Board

The projects will be assessed through the same procedures and marking system, as per below.

The projects will be evaluated considering **two main categories**:

- **ATTRACTIVENESS** | i.e. how the project proposal is aligned to the strategic objectives of HNCDI and of the UK Automotive sector.
- **ACHIEVABILITY** | i.e. how easy is to deliver the proposed project outputs in terms of complexity, capacity and risks.

Both the categories are divided in 6 subcategories as per table below:

	ATTRACTIVENESS		ACHIEVABILITY	
	Sub-category	**Description**	**Sub-category**	**Description**
1	STRATEGIC ALIGNMENT	*The project aligns well with UK government priority R&D investment areas, and key industry and governmental organisation innovation strategies, the HNDCI strategic technology areas, and in particular with the relevant UK automotive sector (represented by APC)*	SCOPE CLARITY	*The scope of the project is clearly defined with a logical delivery approach, output & expected outcomes and impact, producing relevant Case Study to industry at the end of it, i.e. answering to the question "What success looks like"*
2	NOVELTY	*The proposed solution is novel and quantifiably advances the state-of-the art in a particular field(s), generating new or improving relevant capabilities*	ABILITY TO DELIVER	*The HNCDI team, in collaboration with the proposal initiation, can deliver the project under the constraints of the Automotive Sector Call Programme and available skills*
3	SECTOR IMPORTANCE, POTENTIAL IMPACT AND SPILLOVER OPPORTUNITY	*The project is impactful to the sector and beyond, and key stakeholders in HNCDI strategic areas, e.g., increasing productivity (better, faster, cheaper), ROI*	TIMING OF THE PROJECT	*The project fits with the Automotive Sector Call time window*
4	TRANSFERABLE SKILLS	*The project is generating skills usable by current and future workforce and that could be re-deployed in other sectors for cross-pollination*	RISKS OF THE PROJECT	*There is a pro-active risk management process in place to identify and mitigate/accept risks*
5	LIKELIHOOD OF TRANSITION	*The project outputs are likely to lead to adoptable solutions*	INVOLVEMENT OF UK INDUSTRY / GOVERNMENT ORGANIZATION	*The engaged partners have relevant/appropriate skillsets, ability to dedicate time to the project, can provide data assets to support capability development. External partners can evidence a desire to collaborate and co design solutions.*
6	LIKELIHOOD OF CAPABILITY TRANSFERENCE INTO INDUSTRY	*The project outputs are likely to be directly implemented into industry following project complete*	DEPENDENCIES OF THE PROJECT	*The internal and external project dependencies are clearly identified and do not impact scope/timing*

Each sub-category will be given a score from 0 (lowest) to 10 (highest).

An averaged, non-weighted score will be derived for each category. We are seeking a balanced portfolio of projects, ranging from highly novel research projects to those with very high level of capability transference.

Projects that will position as high-ranked in both categories will be considered for the next phase.

To diversify the portfolio of projects, the assessors will also take into consideration:

- the UK automotive sector priority areas that the project is addressing and how the portfolio is balanced;
- the cost of the project to the HNCDI team and its impact to the available budget.
- The value of the project to HNCDI team with respect to validation of its strategic and technological goals.

Ultimately, the proposals that make a strong case for a substantial positive effect of productivity on the UK automotive sector from the adoption of HNCDI strategic technologies and participation in the Automotive Sector programme carry the highest chances of being successful.

Contracting Process

For projects enabled under this call, there is a **two-stage** contracting process in place:

    i)   3 or multi-way CDA
    ii)   Participation Agreement

Examples of both are available on request.

Dates

The competition will be open for Expression Of Interest forms from the 23rd APRIL 2024 to the 4th JUNE 2024 with projects anticipated to commence at the start of November 2024.

Contacts

For more information about the IDEAS Round 3 Call, please use the following contact:
hartreecentre@stfc.ac.uk

Appendix A | The Hartree National Centre for Digital Innovation (HNDCI)

Enabling UK businesses and the public sector to explore and adopt innovative new digital technologies including AI and quantum computing for productivity, innovation and economic growth.

What is HNCDI?

The Hartree National Centre for Digital Innovation is a new collaborative programme between STFC and IBM which will enable businesses to acquire the skills, knowledge and technical capability required to adopt digital technologies like supercomputing, data analytics, artificial intelligence (AI) and quantum computing.

Through HNCDI we provide a safe and supportive environment for organisations to explore the latest digital technologies and skills, develop proofs-of-concept and apply them to industry and public sector challenges. Our dynamic and collaborative approach is driven by industry requirements and will help organisations to de-risk investment in new and emerging digital technologies. Whether you're at the start of your digital journey or trying to advance to the next level, we can help you navigate the possibilities of AI and quantum computing technologies to discover the next step for your organisation.

Who is it for?

We're here to help organisations and individuals with an appetite for change, who are ready to innovate and create useful solutions, enhance, and adapt products and processes, adopt new digital technologies and expand into new markets.

Whatever the size of your business or organisation we have an established track record working with industry, from start-ups and SMEs to large corporates, and public sector organisations such as NHS Trusts and local government.

We also offer training on an individual and group basis.

Why work with us?

The Hartree National Centre for Digital Innovation (HNCDI) is uniquely positioned at the intersection of exciting new science and industry applications and will grow a community of discovery that combines advanced digital technologies and applies the scientific method to address key challenges across UK industry. The partnership between STFC Hartree Centre and IBM Research will bring together an established track record in applied research and innovation with a strong network of collaborators across industry and research communities built on shared interest and a goal to accelerate innovation by reducing the risk of exploring and adopting emerging technologies.

HNCDI is part of IBM's global Discovery Accelerator initiative, which seeks to accelerate discovery and innovation based on a convergence of advanced technologies by establishing research centres that foster collaborative communities and advance skills and economic growth through large-scale programmes. This programme builds on our previous Innovation Return on Research partnership with IBM Research, which was committed to solving industrial challenges and creating societal and economic impact.

Appendix B | Advanced Propulsion Centre (APC)

The Advanced Propulsion Centre UK (APC) provides a vital link between industry, academia, and government, our mission is to use the UK's rich heritage for innovation and entrepreneurship and support the growth of a sustainable, domestic supply chain, focused on developing zero-emission propulsion technologies for a rapidly evolving automotive market.

To date we have facilitated investment of over £1.5 billion, delivered 264 programmes through our network of 492 active partners, from university spinouts to SMEs and volume vehicle manufacturers. In addition, we have contributed to the safeguarding or creation of 58,000 skilled UK jobs.

Appendix C | Frequently Asked Questions

How are projects being funded?
Projects will be directly funded through the HNCDI Programme through government investment into the STFC Hartree Centre.

How and when will I be notified if my EOI or full proposal is successful?
EOI application results will be emailed to the contact information provide on the EOI Form no later than 4 weeks after the call close date. The HNCDI team will work with successful applicants on the full proposal which will be assessed by the HNCDI Management Board.

Do EOI submissions have to come from within the automotive sector?
The Automotive Sector Call team will accept proposals from organisations outside of the automotive sector. However, the overall scope, objectives, and activity carried out within a project should be demonstrated through a primary use case in automotive.

Do I need to establish a consortium to submit an EOI?
No, the Automotive Sector Call Programme is specifically designed to accommodate a single organisation that would work with the STFC and IBM teams.

Can non-UK companies submit an EOI proposal and access the IDEAS Call services?
Overseas companies can only submit an EOI proposal if they have UK registered subsidiary and can guarantee that the R&D in a resulting supported project will be carried out in the UK and the results of the projects will be exploited from or in the UK.

What is the difference between HNCDI and IDEAS Call?
The HNCDI is the wide initiative under which the IDEAS Call Programme is running. Whilst the HNCDI covers a broader scope, the IDEAS Call will be targeting the Automotive sector only.

Appendix D | Expression of Interest Form

Introduction & Background

Brief introduction that provides background and context for the reader (approx. maximum 500 words)

Problem Statement

Describe the problem you are encountering in sufficient detail that allows the reader an understanding of the challenges you face. This should include:
- *Clear description the problem challenge or business need*
- *Describe the current situation and how we expect this project to change it*

(approx. maximum 500 words)

Previous Attempts to Solve the Problem

Describe what previous attempts have been made to solve the problem.
- *Approaches taken, including analytical methods used;*
- *Barriers identified*
- *Conclusion of these efforts.*
- *Have you seen a solution to a similar problem in another application / field?*

(approx. maximum 500 words)

Solution Specification

Describe the key criteria the solution must fulfil? What criteria are desirable but not essential?
- *Things to consider: Functionality, Customisability, Adaptability, Accessibility, Availability, Compatibility, Interoperability Scalability, Accuracy, Precision, Security, Privacy, Ethical.*
- *The expected technical outcomes of overcoming the problem.*

(approx. maximum 500 words)

Expected or Estimated Impact/Value of the Project to your Business and/or Potential Impact to Wider Industry, Society, etc.

Please complete the boxes below (approx. maximum 100 words each)

Will there be an increase in revenue? Including sales, licensing, exports, etc. (Include estimated value in £).	
Will the quality of products or services improve?	
Will there be an increase in employment of staff?	
What is the expected business impact of the solution (inc. approx. timeframe)?	*e.g., new product offering in 12 months, new product feature in 6 months, immediate process improvement, overcome barriers to progress, etc?*
Will the successful completion of the project provide a technological advancement to gain competitive advantage?	
What benefits could the project have more widely to your industry?	
What benefits could the project have more widely to your geographical region?	
What other impacts could be expected from this work?	

Company Details
Please complete the boxes below

Company name	
Companies House registration number	
Company's registered address (head office)	
Company's trading address (if different)	
Postcode where majority of work will be carried out	
Lead contact at company and contact details	
Total number of staff and size of organisation	
Where did you hear about the Automotive Sector Call programme	