Rail Freight Innovation for the Physical Internet

Innovate UK

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Innovate UK is part of
UK Research and Innovation

About Innovate UK

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UK Research and Innovation

Innovate UK

Innovate UK drives productivity and economic growth by supporting businesses to develop new ideas.

We connect businesses to the people that can help them, and fund businesses and research collaborations in all economic sectors, value chains and UK regions to accelerate innovation.

Innovate UK

Investment of
£2.5bn
since 2007

Industry match funding taking the total value of projects above
£4.3bn

Up to
£18bn
in added value to the economy

Up to
£6-7
for every **£1** we've invested

We've funded around
11,000
projects

8,500
unique organisations involved

9 jobs
for each organisation involved

70,000
jobs created in total

Smart Grants

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- Open to the best cutting-edge or disruptive ideas or concepts with a view to commercialisation.

- All proposals must be business focused, rather than pure research. Applications can come from any area of technology (including arts, design, media or creative industries), science or engineering and be applied to any part of the economy.

- Detail:
  - *Project duration between 6 and 18 months: total costs must be between £25,000 and £500,000 and can be single company or collaborative*
  - *Project duration between 19 and 36 months: total costs must be between £25,000 and £2 million and must be collaborative*
  - *All projects must include at least one micro, small or medium-sized enterprise (SME)*

- Closes 24th July - £25m

Industrial Strategy Challenge Fund: **Grand Challenges**

INDUSTRIAL STRATEGY

AI and data economy

Putting the UK at the forefront of the artificial intelligence and data revolution

Ageing society

Harnessing the power of innovation to help meet the needs of an ageing society

Clean growth

Maximising the advantages for UK industry from the global shift to clean growth

Future of mobility

Becoming a world leader in shaping the future of mobility

Grand Challenge:
Future of mobility

We are on the cusp of a profound change in how we move people, goods and services around our country. This is driven by extraordinary innovation in engineering, technology and business models.

We will support UK businesses to improve customers' experience, drive efficiency and enable people to move around more freely.

Early-Stage Innovations Within Freight

Innovate UK Projects

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20/08/2019

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F3 Project
Fast Frequent Fulfilment

Department for Transport

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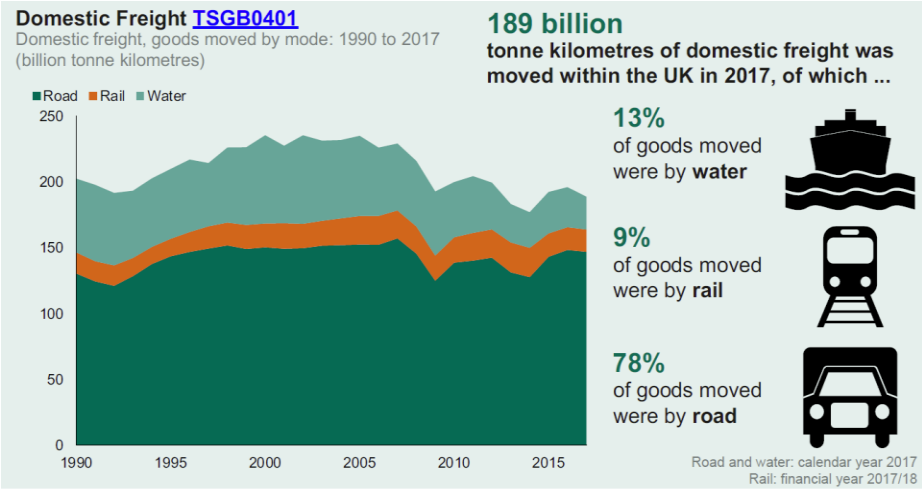
The project is built around the simulation of very intensive short train operations linked to terminal operations for the rapid loading and off-loading of containers, pallets and roll cages for onward delivery. The emphasis is on high value time sensitive cargo, fast frequent fulfilment and to meet the demanding and evolving imperatives of shippers.



The project aims to make freight a competitive option when compared to road freight.

The Cost Outcome:

8 container train	more expensive than all road transport
10 container train	breakeven
12 container train	cheaper than all road transport

F3 Project

Department for Transport

Innovate UK

- Closed loop
- Tracking and condition monitoring
- 45’ pallet wide – allows 26 standard pallets
- Curtain-sided for rapid loading and unloading
- Double stacking of pallets under investigation
- Closed loop allows bespoke container design

The LHOFT Project

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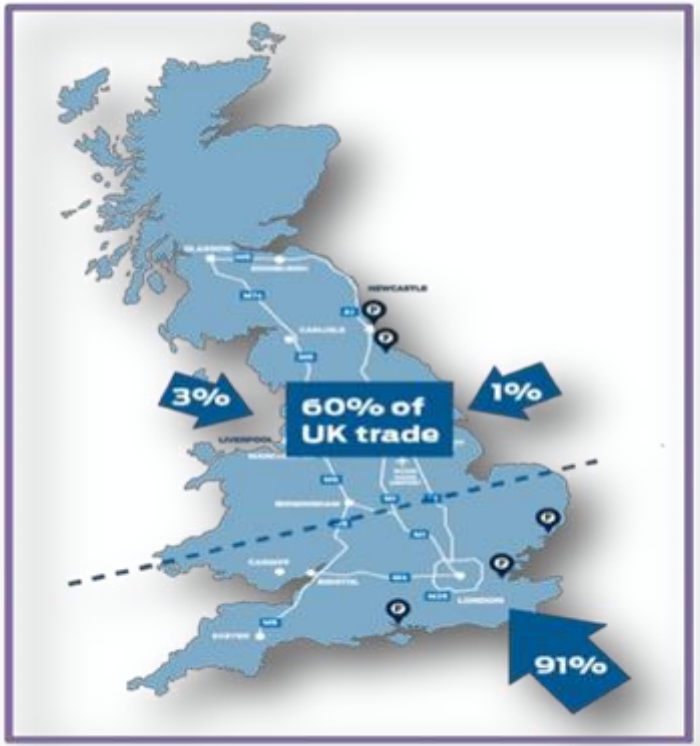
The Liverpool to Humber Optimisation of freight Transport (LHOFT) identified that one of the problems with international trade flows in the UK is that 91% of container freight is landed at and flow from the southern ports (i.e. Southampton and Dover) yet 60% of freight is destined for the Midlands / the North. The result is large volumes of north/south freight flows resulting in congestion and environmental impact.

The proposed Humber route in this project is up to 2 days quicker than the Channel Tunnel route. The Carbon savings of routing to Doncaster from Hull or Immingham could be as much as or in excess of one million tons of carbon.



Partners

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First of a Kind 3

Innovate UK Projects

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SBRI (Small Business Research Initiative)

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SBRI Government challenges. Ideas from business. Innovative solutions.

- SBRI offers innovators the chance to win a government contract to help demonstrate and develop their new technologies

- Development Contracts
  - 100% funded R&D (procurement contract)
  - Operate under procurement rules rather than state aid rules

- Contract with Prime Supplier rather than all partners

- IP rests with Supplier

- Focus is to deliver innovations onto the railway

First of a Kind 3 Competition (SBRI)

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Department for Transport

Key freight themes included:

- improved timetabling and scheduling, to allow a wider variety of freight to be shipped
- improved routing and tracking capabilities, for example to ensure that the railway can integrate fully with intermodal freight and services to develop new markets for light packed, high value goods
- flexible interiors for light freight
- noise impact of freight trains
- freight handling automation
- multi-functional rolling stock
- innovation to make electrification compatible with freight depots
- delivery of freight by rail into congested city centres.
- next generation logistics
- automated modal interchanges, allowing freight to be transferred quickly and efficiently for onward transit
- innovation to support freight operations during railway construction, such as spoil disposal
- better wagon design
- improved operation through new freight hubs
- self-assembling consists
- repurposing of redundant passenger and freight rolling stock
- freight solutions which work in tandem with passenger services
- innovation that might support future autonomous freight trains
- lower cost of whole life operation
- innovation to make rail freight more competitive compared to other transport modes and to reduce freight costs
- passenger luggage solutions
- innovation in freight diversionary activities
- last mile interface for freight delivery
- reduction of end-to-end freight journey times

First of a Kind 3 Projects

Department for Transport

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METEOR POWER

Retrofit EURO 6 Diesel Hybrid System For Shunters & Other Freight Applications

Harry Needle Railroad Company (HNRC) renovates and hires out hundreds of older engines and even has the facilities to undertake work for other engine operators. Some engines, like the Class 08s in particular, are in high demand. Harry estimates that there are around a hundred in the UK that could be given a new lease of life and several hundred more around the world.

The long term target is clearly to switch everything to pure electric or hydrogen power although without the investment in infrastructure and new engines this is some way off yet. The first stage, i.e. the scope of this project, is to replace the ancient 92.67 litre diesel engine with an integrated modern hybrid electric powertrain using many proven technologies to bring these old engines up to the latest modern EURO6 and NRMM emissions standards.

Decarbonising Freight Locomotives

G-VOLUTION

UK Rail Freight operators face major challenges to their use of diesel locomotives. There is increased attention being paid to vehicle emissions by both the public and politicians within the UK and the British government has placed a requirement on the rail industry to remove diesel only traction vehicles from the network by 2040. This is coupled with an indication that plans to electrify up to 80% of the network will be significantly curtailed for cost reasons. Therefore, UK Rail Freight operators are actively seeking viable alternative solutions for new powertrains for self-powered non-electric / non-infrastructure powered locomotives.
Significant investment in untried solutions will be limited, solutions to move away from diesel must be technically proven, and financially beneficial to succeed.
This project will demonstrate dual-fuelling in the British Freight market using technology that has already been proven the road freight sector in the UK. It will help to develop the business case for dual-fuelling and demonstrate the carbon and cost saving advantages for freight locomotives.

First of a Kind 3 Projects

Department for Transport

Innovate UK

iPort Rail App

HIVELOGIC

This project aims to help address a strategic need to develop a capability of Flexible Freight in the rail sector through the development of a digital platform that will enable diverse actors within the rail-road freight supply chain (incl. Freight Forwarders (FFs), Freight Operating Companies (FOCs), road haulage and end-customers) to contract for rail-connected logistics services, easily and cost-effectively. The collaborative platform will enable more efficient linkage between container-based rail freight arriving at an inland port and its onward journey by road to the end customer.

NR+: UK's first Integrated Digitised Rail Infrastructure Platform for Planning

UNIVERSITY OF HULL

Planning and scheduling of trains are very complex tasks due to their highly specialized and combinatorial nature. In the UK, the required information for planning and scheduling is very fragmented. Planners must deal with a large number of requests and must consider a myriad of infrastructure constraints, consulting a variety of databases and paper-based documents to perform their tasks which is quite frustrating and inefficient in this day and age. The opportunity identified in this project is to demonstrate the rail freight planning process on our integrated digital Network Rail Plus Suite (NR+Suite) of products that consists of the NR+ Infrastructure platform (NR+IP), the NR+ integration Services (NR+IS) and the NR+ set of applications (NR+App). The NR+IP consists of a comprehensive and integrated database of UK's rail network, with all the attributes and constraints that can be queried and viewed on a map, together with the current set of scheduled routes and planned activities

Key Messages

Innovate UK

- We may have projects underway which will help address a problem you have – come and talk to us!

- We are keen to see further innovations within the freight community. Talk to us about your priorities

- Innovate UK Smart Grants offers funding for the most innovative solutions – yours could be one!

Thank you

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