Data to Improve the Customer Experience

Information day: 9 March 2015
RSSB and live webinar broadcast
Introduction

The Rail Research UK Association (RRUKA) and the Association of Train Operating Companies (ATOC) are to invest up to £200,000 in academic-led feasibility studies to respond to the challenge: how can we use data to improve travellers’ experience and their satisfaction with rail transport?

Proposals funded through this call should develop novel ideas and innovative solutions that can help the rail industry use its data more effectively in order to improve the customer experience. Once completed, the successful feasibility studies may be considered for further funding for trials and demonstrations.

Submissions are welcome from non-rail academic experts who may have experience in other fields, which could be transferred or applied to the rail industry.

RSSB has also secured funding for one industrial Collaborative Awards in Science and Engineering (iCASE) studentship from the Engineering and Physical Sciences Research Council (EPSRC) to support research in the area of data to improve the customer experience. Therefore, as part of this competition there will also be an opportunity to apply for funding for one PhD studentship. The same deadlines apply as for the feasibility studies.

This competition opens on 9 March 2015 and the deadline to submit proposals is 27 April 2015.

This document contains some background information about the challenge and serves as guidance for the submission of proposals.

The Rail Research UK Association (RRUKA) is a partnership between the British rail industry and UK universities. Established in 2010, RRUKA builds on a recent resurgence in university-based railway research, and seeks to enhance already strong collaborative relationships between academia and the railway industry. RRUKA activities are co-funded by RSSB and Network Rail.

ATOC’s mission is to work for passenger rail operators in serving customers and supporting a prosperous railway. Set up after privatisation in 1993, the Association brings together all train companies to preserve and enhance the benefits for passengers of Britain’s national rail network.
# Programme

<table>
<thead>
<tr>
<th>Time</th>
<th>Session and Speakers</th>
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<tr>
<td>11.30</td>
<td>Registration opens</td>
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<tr>
<td>12:00 - 13:00</td>
<td><strong>Networking Lunch + poster session</strong>&lt;br&gt;Academic delegates have been invited to prepare posters illustrating their institution's expertise and capabilities relevant to this competition. Posters will be on display on the day and electronic versions will be available on the webinar platform.</td>
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<tr>
<td>13:00 - 13:05</td>
<td><strong>Welcome address</strong>&lt;br&gt;Colin Dennis, Technical Director, RSSB</td>
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<tr>
<td>13:05 - 13:25</td>
<td><strong>Explaining the challenge</strong>&lt;br&gt;Jason Durk, Head of Customer Information, ATOC&lt;br&gt;Edward Welsh, Director of Communications, Rail Delivery Group (RDG)</td>
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<td>13:25 - 13:40</td>
<td><strong>Information: what do passengers need?</strong>&lt;br&gt;Guy Dangerfield, Passenger Issues Manager, Passenger Focus&lt;br&gt;In this session, we will look at what information passengers need to complete a seamless end-to-end journey; how they prefer to be kept informed and which media would deliver the information they want in the most efficient way.</td>
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<tr>
<td>13:40 - 14:15</td>
<td><strong>What we are already doing...</strong>&lt;br&gt;These are quick 5 minute introductions to relevant ongoing projects:&lt;br&gt;a) <strong>South East Flexible Ticketing (SEFT) programme</strong>&lt;br&gt;Mostafa Gulam, Head of Technology, ATOC&lt;br&gt;b) <strong>Darwin Passenger information Systems (PIS)</strong>&lt;br&gt;Nick Wilson, Technical Architect, ATOC&lt;br&gt;c) <strong>What can I do with my tickets initiative</strong>&lt;br&gt;Gary Winstanley, Information Technology Officer, ATOC&lt;br&gt;d) <strong>Stations made Easy (SME) and other accessibility issues</strong>&lt;br&gt;David Sindall, Head of Disability and Inclusion, ATOC</td>
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<td>14:15 - 14:30</td>
<td><strong>TfL case study</strong>&lt;br&gt;Olga Feldman, Strategic Manager, Analytics, Transport for London&lt;br&gt;This session will consider TfL's use of smart ticketing and how they use customer data to understand travelling behaviour and improve the customer experience.</td>
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<td>14:30 - 14:45</td>
<td><strong>Q&amp;A Session - Moderator: Jason Durk</strong>&lt;br&gt;Edward Welsh, RDG&lt;br&gt;Mostafa Gulam, ATOC&lt;br&gt;David Sindall, ATOC&lt;br&gt;Nick Wilson, ATOC&lt;br&gt;Gary Winstanley, ATOC&lt;br&gt;Olga Feldman, TfL</td>
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<tr>
<td>14:45 - 15:00</td>
<td><strong>Coffee break &amp; poster session</strong></td>
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<tr>
<td>15:00 - 15:20</td>
<td><strong>Can rail be digitally inclusive?</strong>&lt;br&gt;Robin Christopherson, Head of Digital Inclusion, AbilityNet&lt;br&gt;In this session, the speaker will discuss how data can be used to increase the confidence of disabled users with rail travel in order to make it more accessible.</td>
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The two presentations that follow will explain how other sectors, which also deal with an abundance of data and information sources, have tackled similar problems to the ones the railway is facing with regard to data aggregation, analysis and reporting practices in order to get more value from available datasets. What lessons can be learned?

**Case study 1: Finance**  
*Martin Cambell, Senior Business Analyst, Mizuho*

**Case study 2: Road network**  
*Roger Himlin, Group Manager TAME, Highway Agency*

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For those of you attending in person at RSSB, the WiFi connection details are:
Username: RSSBGuest  
Password: St3phen5on

The webinar platform will remain available after the event to encourage networking.  
The webinar is available at the following link:  
[live.wavecast.co/data-to-improve-the-customer-experience/](live.wavecast.co/data-to-improve-the-customer-experience/)

Join the conversation on Twitter!  
#RRUKAdata
Competition brief

1. Problem statement and background

The rail industry collects a significant amount of data about the performance of train services, facilities at stations and on-board trains, data about rail assets and for other planning, operations and management purposes. This is constantly being added to with more data of greater currency and detail.

Train companies also create various types of data associated with the provision of their rail services, including fares, timetable and routes. They use this data to provide rail travel information to their customers in a variety of ways, including through approved websites, via mobile phone apps and at stations.

To date, much of this data has been kept locked in its originating systems, however more of it is now being turned into information for staff and customers and this trend will continue as will the willingness of the industry to share this information with third parties (see: http://data.atoc.org/rail-industry-data). This has the potential to transform the way the rail industry plans, operates and manages the network and at the same time it will provide a greater understanding about the movement of people and freight.

1.1. Industry data

National Rail Enquiries (NRE), a department of ATOC, host a number of systems on behalf of the UK rail industry, including the real-time prediction engine known as “Darwin”, the “Online Journey Planner” (OJP), and the “Knowledgebase” which is an online repository of static and real-time contextual information about rail travel in the UK.

- The real time train running prediction engine known as “Darwin” holds the original planned schedules, updated schedules and any new schedules which TOCs may introduce. Darwin logs movements and forecasts received and makes its own forecasts as well as providing a repository for other information NRE generates such as station messages and train alerts.

- The “Online Journey Planner” (OJP) is a software tool that uses a combination of timetabled information, live train running information from Darwin, customer location and ticket pricing to deliver a variety of journey planning services tailored to the customer’s specific needs. The online journey planner powers all journey planning on NRE apps, as well as providing many of the pages of the website.

- The “Knowledgebase” is an online repository of real-time and static contextual information about GB rail travel, including planned engineering work, service disruption, stations facilities and accessibility. It is the platform through which much of the content on the NRE website is managed and updated. Where journey planner and Darwin assist customers with train times and prices, Knowledgebase contains complementary information about travelling by rail, such as station facilities, and available ticket types, engineering works and service disruption.

NRE released an “open access” data portal on 31st October 2014 and are set to launch phase two on 31st March 2015. Darwin feeds are the first to be made available openly through the portal. Knowledgebase and OJP feeds are set to follow in the coming months and years as NRE’s backend infrastructure is modified to handle mass sharing. Those feeds, not currently available via the portal, can be accessed by requesting a license. They come at no cost to the user with the exception of one feed; the Real-time Journey Planning Webservice.
There is a set of funded projects (below) that will be implemented over the current control period (CP5), adding greater depth to the data within Darwin and thus available through the portal. To assist the use and exploitation of this data NRE hold non-transferable SLAs with their suppliers, maintain a technical support forum and hold regular events to discuss and explore the data and further development of the facility. NRE will manage this facility as a common service on behalf of all the operators.

1. Darwin information at Station (CIS)
2. Darwin information on trains (PIS)
3. Train Location and Movement (GPS)
4. Traffic Management link to Darwin
5. TOC Resources information feed to TM and Darwin
6. Connecting train identifiers (CTI)

More information about NRE data feeds, including links to the open access data portal, can be found at the following URL http://www.nationalrail.co.uk/46391.aspx

1.2. The industry vision

Improving the customer experience is one of the critical long-term challenges the industry faces, known as the 4Cs1. Rail must now more than ever meet the rising demands of the customer: offering a superior customer experience is a priority in order to make rail the preferred mode of transport for reliability, ease-of-use and perceived value.

The Rail Technical Strategy 2012 (RTS)2 sets out a vision of the future in which passenger journeys are expected to grow and, in turn, passengers’ expectations for value for money, comfort and facilities will also increase. Therefore, the industry plan is focussed on improving reliability and punctuality, increasing the network’s capacity and ensuring rail services are fully integrated within the wider transport system.

With the explosion of data that the industry is experiencing comes an opportunity to look afresh at the information services provided to the travelling public and to use data to improve the travellers’ experience and their satisfaction with rail transport. The vision statement of the industry is therefore both customer and information centric and can be summarised as follows:

“As an industry we will provide timely, relevant, accurate and consistent information – easily understandable and accessible wherever, whenever and however required – so that all customers can make informed choices about travel plans or assist others to do so.” (Customer Information Strategy, ATOC, 2013).

The RTS envisages that personalised information systems will make use of data from intelligent traffic management technologies to guide passengers through their personalised end-to-end journey, while ensuring the safety and security of both passengers and information. Fare structures will be easier and traditional ticketing systems will be replaced with contactless, smart technologies. Stations will be designed to provide easy access to and from platforms, featuring on-demand facilities that meet customers’ needs as they evolve.

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1 The 4Cs are: increasing Capacity; reducing Carbon; lowering Cost and improving Customer experience.
2 The RTS, produced by the Technical Strategy Leadership Group (TSLG) on behalf of the British rail industry, presents the 30-year vision of how the railway will develop. In order to plan the delivery of the strategy, each RTS portfolio has been divided into a number of Significant Programmes (SPs). Those related to the Customer Experience and Information portfolios, which are relevant to this competition, are listed in Annex A.
Information, and the efficient sharing of it, plays a key role in improving the customer experience. According to research carried out in 2011, the industry (excluding Network Rail’s own systems) had over 130 information systems.

According to ATOC’s Customer Information Strategy, in order to deliver the customer requirements, a Target Operating Model needs to be developed in order to ensure that clear information is provided at all times: in advance of travel; during the journey (at station and on the train) and post-journey. The Target Operating Model would require a number of systems to interface with one another (as showed in Figure 1 below).

Therefore, in order to make better use of the collected data in a cost effective and efficient way, the industry would benefit from a coordinated approach towards system architectures, information management and information exploitation. This will facilitate integration and information-sharing, while allowing the industry to benefit from new technologies more quickly.
2. Challenges

Despite constant efforts, much more needs to be done in order to achieve the industry’s vision described above and to provide excellent customer experience, especially during periods of disruption. Four challenge areas have been identified related to the issue of using data more effectively to improve the customer experience, represented in Figure 3 below. The feasibility study and the iCASE proposals will have to relate to one (or more) of the challenge areas.

A. Accessibility: With the predicted changes in passenger demographics, the uptake in rail travel by users with special needs and/or disabilities will increase steadily. Also, with the requirement for all trains to meet European standards of accessibility by 2020, there will be an incremental interest to improve the accessibility of trains, accessibility to the station, but also access to websites, apps etc.

- How can rail services be made more accessible (consider all aspects, i.e. before, during and after a train journey)?
- How can data be used to increase the confidence of disabled users with rail travel?
Data to Improve the Customer Experience

- How can customers interact seamlessly with other modes of transport?

**B. Customer Comfort:** The industry collects data about services availability and their status. New trains are entering service equipped with sensors to monitor aspects of the carriage interiors and train refits include the installation of a number of RCM technologies. In addition, new systems able to monitor real-time status are being deployed on board trains and at stations. Passengers can also use freely available services to feedback issues with the travelling environment (heating; Wi-Fi; seating etc.) via social media and feedback forms.
  - How can the rail service provide the best service for its customers, according to the type of journey they’re making?
  - How can we empower passengers to be data gatherers?
  - How can we measure customers’ use of services in order to inform future design and/or development of stations/trains etc.?
  - How could we communicate train capacity and usage in real-time?

**C. Information:** The cost and capability associated with collecting, processing and publishing information, including the ubiquitous ownership of smart devices, is changing. This means that the rail industry needs to ensure the information it provides to customers is relevant and personalised to each individual customer’s need. This is in the context of the ever changing background of user expectations and the need to reduce the reliance on high cost capital programmes that are in danger of being outdated before they are fully rolled out.
  - How can we be in tune with customers’ expectations in a more agile way?
  - What can be done to make the customers’ journey personalised to their needs?
  - How would future customer information systems work?
  - How can we better reassure travellers as they move through the transport service interchanges?
  - How can the rail service provide better and real-time visual representation of service information to its customers?
  - How can innovative technologies and new schemes such as the introduction of smart ticketing be leveraged to improve the customer experience?

**D. Data Sources:** In the past, much of the rail data has been dealt with in silos or available only in systems with restricted access. With a programme of system renewals and replacements, more data is potentially becoming available but major issues exist around matching and joining data and, in certain cases, preserving confidentiality and security.
  - What new streams of data will need capturing and how will they help improve the customer experience?
  - How could we bring data together from different sources to allow travellers to make better travel decisions?
  - In what ways could we structure unstructured data, so that they can be used to improve
service?

- How can data be managed to give confidence to data owners regarding its use and security?

3. A fresh approach

This competition seeks novel ideas on how to make best use of current data to improve the customer experience and make rail customers’ preferred form of transport for reliability, ease-of-use and value. The innovative ideas put forward by the academic community will have to show a good understanding of the needs of the ‘customer of the future’ and will have to consider how to ensure data safety and security. The proposals could also test the feasibility of future technologies and their impact on rail customers (i.e. wearable technologies; advance recognition systems; augmented reality solutions etc.). Potential bidders are encouraged to think beyond traditional constraints and foster collaborations with people in disciplines and backgrounds different to those they would normally collaborate with.

4. Information day

Attending the information day on 9 March 2015 is not a funding pre-requisite but it is highly recommended. Those interested can attend the information day either in person or via webinar:

- **Webinar**: the presentations will be broadcast live; you will have an opportunity to ask questions and network with attendees and speakers. To access the webinar platform, visit: live.wavecast.co/data-to-improve-the-customer-experience/
- **Face-to-face**: you can join in person at the RSSB office on 9 March 2015.
If you have missed the information day, you can visit the webinar platform at any time to view the recording of the day, access information and interact with delegates and presenters using the dedicated networking area by using the link provided above.

Copies of the presentations and a list of reading material will be available on SPARK (www.sparkrail.org - once you have logged in, search for: “RRUKA Data to Improve the Customer Experience).

5. Feasibility studies

5.1. Proposal format and guidance

We are expecting good quality proposals, clearly written and formatted.

Please use the proposal template and costing breakdown table available on the RRUKA website: http://rruka.org.uk/events/data-to-improve-the-customer-experience/

Your proposal should include the following:

- **Detailed project description including:**
  - clear scope and objectives;
  - methodology (including data sources needed and suggested method of processing them);
  - breakdown of tasks;
  - description of expected deliverables for each task and associated delivery dates.

- The project description should be supported by a **project plan**: a graphic representation of milestones, activities and deliverable dates. It is expected that, if successful, the project plan will be updated regularly by the project team and will be discussed during the project monitoring meetings.

- **Next steps and benefits**: Description of the next steps should the proposal be successful and explanation of the associated potential benefits.

- **Costing**: Breakdown of cost using the template provided. NOTE: feasibility studies should be cost at 80% FEC. Overheads and bursaries are allowable costs.

- List of all **academic consortium members**, including a short summary of expertise

- List of all **industry consortium members**, if any, including a short summary of expertise.

- Half-page **lay summary** which we will upload on SPARK, if your feasibility study is selected and funded.

Please note that the review panel may request additional clarifications or may ask for a proposal to be resubmitted if it does not meet the requested format.
5.2. Evaluation criteria

All proposals will be assessed by a panel drawn from industry and academia. Proposals will be evaluated according to the following criteria:

- a) Overall clarity of the proposal
- b) How well does the proposal address the challenge(s)
- c) Scientific value and novelty of the proposed work (i.e. novel concepts, approaches, methodologies, tools etc.)
- d) Value for money of the proposed feasibility study
- e) Evidence of early and sound thinking on next steps and ‘routes to market’
- f) Evidence of adequate plans for industry engagement during the feasibility study

Criteria are all equally weighted and will be scored as follows:

0 = Does not meet the criterion
1 = Significant concerns about ability to meet criterion
2 = Minor concerns about ability to meet criterion
3 = Confident that response fully meets criterion

5.3. Consortia guidance

A successful consortium is likely to consist of participants with a range of disciplinary perspectives and different rail expertise.

- **Academic input:** Please note that all academics wishing to submit a consortium bid need to be registered RRUKA members. Researchers from non-UK based universities or research institutes can take part but they need to be part of a consortium where at least one member is a UK-based institution and an institutional member of RRUKA. If you are not registered (or if your University is not an institutional member), please visit: http://rruka.org.uk/membership/.

- **Industry input:** Consortia can include industry experts. Industry representatives are encouraged to provide their in-kind support, however they are not eligible for funding.

- **Contractual arrangements:** Consortia must be academic-led. The funding will be for the university partner(s)

5.4. Funding

If a proposal is accepted, each consortium must appoint a lead academic partner who will be responsible for receiving and managing the funding accordingly. RSSB will contract directly with the lead academic partner.

RSSB will issue a grant agreement. The lead academic partner is required to sign and return it with 30 days of receipt or funding may be withdrawn.

RSSB will fund as many feasibility studies as can be afforded within the available £200k funding. Potential bidders should note that 3 to 5 feasibility studies are expected to be funded.
5.5. Future funding opportunities
Once the successful feasibility studies have been completed, and if the projects demonstrate the required stage of development, they could be considered for trials and demonstration or for additional funding via other streams.

6. iCASE studentship
6.1. Eligibility
The opportunity is open to all researchers and their groups. Please note that academics interested to submit an iCASE proposal need to be registered RRUKA members. If you are not registered, please visit: rruka.org.uk/membership/

The proposal should include a significant component of research in the engineering and physical sciences space. At least 50% of the project should be ‘significant’. EPSRC’s rules state that they will only fund universities who are the recipients of a doctoral training grant from EPSRC for FY2014-15. However, they may consider exceptions if the best proposal comes from a university who does not receive a training grant this year.

6.2 Criteria
All proposals will be assessed by a panel drawn from industry and academia. Proposals will be assessed according to the following criteria:

- Novelty of proposed work
- Clarity of scope and objectives of the proposed PhD
- Value of the knowledge generated to the rail industry
6.3. How to apply

In order to apply, please fill out the one-page iCASE proposal form available via the RRUKA website giving details of the project you wish to put forward. This could be aligned with a proposal for feasibility study funding or it could be separate.

7. Key dates

All the proposals should be submitted by 27 April 2015 via email to secretariat@rruka.org.uk. In the email subject use “Competition: Data to Improve the Customer Experience.

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<tr>
<td>Proposals due</td>
<td>by 27 April 2015</td>
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<tr>
<td>Winning bids will be announced</td>
<td>w/c 18 May 2015</td>
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<tr>
<td>Feasibility studies due to start</td>
<td>no later than 7 September</td>
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<td>Presentation of winning bids at the RRUKA Annual Conference</td>
<td>November 2015</td>
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<td>Project outcomes presentations at the RRUKA Annual Conference</td>
<td>November 2016</td>
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Why join RRUKA?

By joining RRUKA you will become part of a thriving community of academics who undertake research addressing issues of importance to the railways. RRUKA will help you make contact with the industry parties who could inform, support, use and fund your research.

Who can join RRUKA?

Membership of RRUKA is recognised at institutional level. UK universities or other institutions eligible to receive research council funding can become RRUKA members. Academics can register as individual researchers if their university is already an RRUKA institutional member.

To join visit the RRUKA website: rruka.org.uk/membership/
Appendix A – RTS Significant Programmes

**Information Portfolio – Significant Programmes:**

1. **SPM01: Information Governance**
   - Develop an information governance model to assist the collection, management, analysis and use of information.

2. **SPM02: Railway Data and Information Architectures & Protocols**
   - Create an information architecture to describe a Shared Information landscape together with the standards & protocols to facilitate the sharing of information. Includes: ontology; data models and metadata.

3. **SPM03: Information Security and Resilience**
   - Establish an approach to increasing whole system understanding, coordination and cooperation in digital information security. Develop standards and guidelines to increase the resilience and recovery of systems to Cyber threats

4. **SPM04: Information Sharing**
   - Create a model that describes the sharing of information to support shared process flows both human and directly between information systems.

5. **SPM05: Information Exploitation**
   - Develop approaches to exploit information to increase its value by facilitating increased revenue, customer satisfaction, taxpayer value and improving environmental impact

**Customer Experience Portfolio – Significant Programmes:**

1. **SPU01: Freight Customer**
   - Increase the opportunity, capacity and ease for freight customers to engage and use the railway; working with FOCs look to innovate in moving a larger range of freight more swiftly using national and international services

2. **SPU02: Passenger: End to End Journey**
   - Continue to evolve and deliver seamless and continuous passenger journeys from point to point, where the rail journey may (or may not be) a mode in the travel plan. Liaise with other mode developers to assist integration with the rail mode.

3. **SPU02-A: Customer Research – Social and Emotional Profiling**
   - Human Factors in the reducing the stress and increasing the pleasure of ‘travelling End to End’

4. **SPU02-B: The Train Journey – Use of time**
   - Time is increasingly valuable and time spend travelling can be very productive, with both economic and social benefit

5. **SPU02-C: Cycling / Access to Railway stations**
   - Improve the facilities and capacity at stations for cyclists at and access to stations and developing the overall attractiveness of the railway to commuting and leisure cyclists

6. **SPU03: Friendly Big Brother (A Railway Customer Database)**
   - A universal railway customer database, and associated information and intelligence collection, security, storage and exploitation to benefit the customer and railway alike

7. **SPU04: Personalised Right-time Information**
   - A real-time information service to railway customers providing information and intelligence during their whole journey and especially with regards to planned and unplanned events

8. **SPU05: Virtual Ticketing**
   - In conjunction with the whole journey, continue to roll out ticketless universal travel permissions, increased visibility of and automatic ‘best pricing’ of tickets, improved and discrete revenue security and protection, gateless platform / station passage. Innovate with ‘buy the journey’ approach.
9. **SPU06: Health, Safety and Security**
Continue to work at improving Customer, Passenger and General Public HSS across the railway; balancing the need for intrusive approaches with covert, sensor and intelligence led approaches. Innovate and reduce the risks to passengers on trains and at stations; improved & dynamic signage, interactive approaches (e.g. holograms, active guidance).

10. **SPU07: Station of the Future**
Quantum change in design and maintenance of railway stations in order to meet and exceed Staff, Customer and General Public expectations.