Association of Train Operating Companies

ATOC/GN036

Issue 1.1

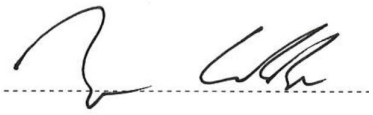
24 May 2016

ATOC Guidance Note – Risks & Opportunities from ROCs and TM

Submitted by

Steve Price
Operations Planning Advisor, ATOC

Authorised by:



Roger Cobbe
Chair, ATOC ERTMS Steering Group

Gary Cooper
Director of Operations, Engineering and Major Projects, ATOC

Synopsis

This document provides guidance to train operators on identifying the risks and opportunities that arise from the introduction of Rail Operating Centres and Traffic Management.

Contents

Part A

Issue Record

This document will be updated when necessary by distribution of a complete replacement.

Issue	Date	Comments
One	May 2016	Original document
1.1		Correction of title page and minor updates to RACI

Responsibilities

Copies of this Guidance Note should be distributed by ATOC members to relevant persons within their respective organisations.

Explanatory Note

ATOC has produced this document for the information of its members. ATOC is not a regulatory body and compliance with this document is not mandatory. Although aimed primarily at TOCs, the contents may also be useful to FOCs.

ATOC Guidance Notes are intended to reflect good practice. ATOC members are recommended to evaluate the guidance against their own arrangements in a structured and systematic way. Some parts of the guidance may not be appropriate to their operations. It is recommended that this process of evaluation and any subsequent decision to adopt (or not to adopt) elements of the guidance should be documented.

This document reflects the position reached with the introduction of ROCs and TM as at the end of 2015. It records also some of the likely risks and opportunities that may arise and that train operators will need to give thought to.

Guidance Note Status

This document is not intended to create legally binding obligations between Railway Undertakings and should be binding in honour only.

Supply

Copies of this Guidance Note may be obtained from the ATOC members' web site.

Part B

1. Purpose

This document provides guidance to Railway Undertakings on identifying the risks and opportunities that arise from the introduction of Rail Operating Centres and Traffic Management (technology, processes and roles).

2. Scope

This document applies to all ATOC Members.

3. Definitions

ARAMIS	A Traffic Management (TM) System provided by Thales for integrated Network and Centralised Traffic Control centres. It centralises and automates the management tasks of railway operators. It is a key element of every modern Operation Control Centre. The system automatically controls, supervises and records the rail way actual traffic. It performs automatic conflict detection, conflict solution and proposes optimised operational solutions.
Pod working	Arranging the workstation & desk layouts so that those individuals responsible for a common geographic area are located together, to improve inter-working and liaison between differing roles, irrespective of whether these have signalling or control responsibilities.
Route Operating Model	A description of the operational roles, processes, and technology for Traffic Management within a Rail Operating Centre, to facilitate staff understanding and consultation, guide suppliers and act as a reference document for subsequent deployments of Traffic Management.

4. Introduction

The National Operating Strategy (NOS) was the term used to describe a series of Network Rail-led initiatives that individually or collectively were intended to transform the way in which the GB mainline railway is controlled and its associated economics. The Strategy evolved until early 2015 when it included such initiatives as European Rail Traffic Management System (ERTMS), Traffic Management, Combined Positioning Alternative Signalling System (COMPASS) and Connected Driver Advisory System (C-DAS) as well as the introduction of Railway Operating Centres (ROCs). Whilst the primary aim was to achieve OPEX savings for Network Rail, the Strategy was intended to move the industry closer to 7 day railway, allow improved management of (and recovery from) perturbation, and permit increased numbers of trains to be handled, all without wholesale enhancements to physical infrastructure capacity.

NOS is a major component of Digital Railway (DR) with the latter title having taken over as the means by which the transformation programme is referred.

DR is intended to be an industry-wide programme seeking to deliver strategic outcomes identified in the Rail Technical Strategy 2012. These include the provision of additional capacity, improving the passenger journey experience, improving performance and resilience on the Network and allowing improvements to safety. At the time of publication, DR has confirmed that the CP5-committed schemes within NOS will be delivered – First Deployment of TM at Romford & Cardiff ROCs with initial deployments of ETCS (ERTMS) to the Western and East Coast Main lines - and has yet to make proposals beyond that.

For the purpose of this document, the term NOS will be used unless specific reference to DR is either required or intended. It is envisaged that the advent of DR will give rise to a number of alterations to the content of this document as 2016 progresses.

The ROCs are strategically-located buildings that will house functions traditionally undertaken by signal boxes, Electrical Control Rooms and Route Controls and intended to allow co-location of key people to simplify communications and decision-making. Some TOC Controls will also work alongside such staff. There are 12 ROCs planned in total, some of which will be purpose-built buildings, whilst others will be modified to suit their new intended purpose.

The following is a summary of responsibilities:

Introduction of ROCs (not exhaustive)	NOS / DR	NR Routes	Train Operators	Supplier	NRT		
National Specification	A/R		C	I	C/I		
Migration of Signalling		A/R	C				
Migration of Control		A/R	A/C				
Migration of Electrical Control		A/R	I				
Interface with train operators not co-located		A/R	C				
Issue of Network Change – introduction of ROCs	Not applicable						
Issue of Network Change – migration of signalling		A/R	C				

R = Responsible, A = Accountable, C = Consulted, I = Informed

Where more than one Accountable party is identified for any activity, that party is only accountable for the elements within its control

The term Traffic Management (TM) describes the roles (people) and processes employed, together with the control systems and associated decision support tools (including telecommunications, data, software and hardware), which will facilitate real-time execution and optimisation of the plan with the resources available, and thereby permit the ROCs to manage their geographic responsibilities more efficiently. These roles, processes, systems and tools introduce greater automation and consistency of task completion, together with enhanced prediction and resolution of conflicts, whilst combining improved co-ordination during perturbation with better just-in-time planning. Traffic Management systems are in use widely across mainland Europe as well as Japan and the United States.

TM will be introduced initially within the GB mainland railway at Romford (Anglia) and Cardiff (Wales), by the end of 2016. [1] The following is a summary of responsibilities:

First Deployment of TM (not exhaustive)	NOS / DR	NR Routes	Train Operators	Supplier	NRT		
National Specification	A/R		C	C/I	C/I		
Migration of Signalling		A/R	C	R	C		
Development and agreement of Route Operating Model		A/R	C	C	C		
Interface with train operators not co-located		A/R	C	C	C		
Issue of Network Change – TM deployments (not including signalling migration)		A/R	C				

R = Responsible, A = Accountable, C = Consulted, I = Informed

[1] *The statement about TM introduction dates is correct, given this document records the position as at the end of 2015. During 2016, the decision was taken by NR to defer the introduction of TM at Cardiff to 2017*

After the initial deployments of TM, it is expected that there will be further deployments. Whilst the only firm proposal as yet will be to introduce a form of TM into the Thameslink Core in 2016 or 2017, deployment proposals are expected to be made as part of the Initial Industry Plan for Control Period 6. The following is a summary of the expected responsibilities when considering subsequent deployments.

Subsequent deployment of TM (not exhaustive)	NOS / DR	NR Routes	Train Operators	Supplier	NRT		
National Specification	A/R		C	C/I	C/I		
Migration of Signalling		A/R	C	R	C		
Development and agreement of Route Operating Model		A/R	C	C	C		
Creation of pod working		A/R	C/I	I	I		
Interface with train operators not co-located		A/R	C	C	C		
Issue of Network Change – Complex Projects Procedure Notice	A/R	C	C				
Issue of Network Change – TM deployments (excluding signalling migration)		A/R	C				

R = Responsible, A = Accountable, C = Consulted, I = Informed

5. Industry Governance and Standards

5.1 National Operating Strategy

A governance framework for the NOS was agreed in October 2014 by the Programme Control Board and takes account of the differing needs of various stakeholders. For the purposes of this document, that framework, as applied during 2015, is summarised below, although minor changes have been made since then to take account of the establishment of Digital Railway.

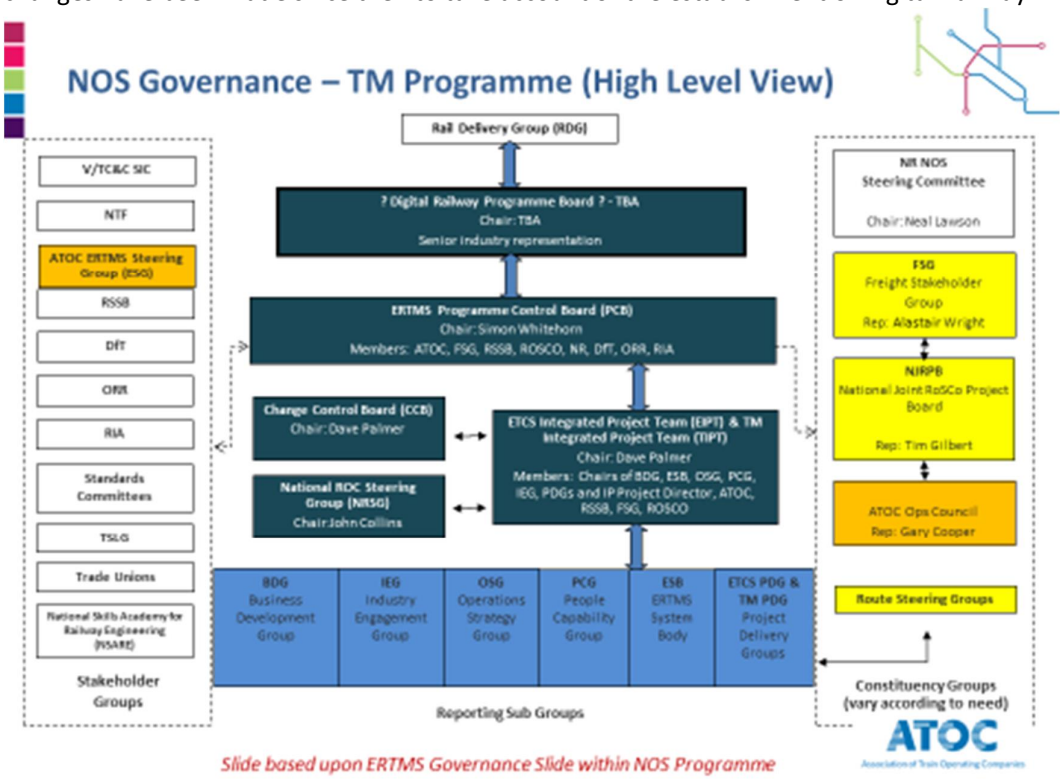


Figure 1 – TM Governance Structure

At the heart of this governance structure lies six working level groups:

- Business Development Group (dormant as at 31 December 2015);
- Industry Engagement Group (dormant as at 31 December 2015);
- Operations Steering Group;
- People & Capability Group;
- ERTMS Systems Body;
- Project Delivery Group.

The Chairs of these groups report to the Integrated Programme Team (IPT) meeting which maintains tactical oversight of the progress of the Programme and the achievement of identified benefits. Above the IPT meeting sits the Programme Control Board which provides

a strategic cross-industry focus, setting the vision and providing direction and policy to the Programme, and which is attended by senior managers from across the industry.

Each of the identified groups and meetings has approved Terms of Reference and include both Programme and industry representation (including train operator or ATOC attendees), as appropriate.

Since being established, this structure has remained largely unchanged, although neither the Business Development Group nor the Industry Engagement Group have been introduced, and the TM Project Delivery Group has been refocused to concentrate solely on First Deployment.

A Traffic Management Operators' Working Group (TM OWG) has been established with invitations extended to all train operators, with the intention of considering the detail associated with TM and ROCs, especially around the high level or national requirements. TM OWG has agreed Terms of Reference and acts as a sub-group of Operations Steering Group (OSG) to inform the deliberations of the latter. TM OWG also maintains links with other working level groups, as listed above, as necessary.

Risk: Changes in governance arising from the advent of Digital Railway could reduce the ability of train operators to engage effectively with the programme. Train operators are able to place more reliance on Route governance arrangements and should satisfy themselves that these are understood and that there is active engagement with these at an appropriate level. Train operators should familiarise themselves with their owning group Operations Council representative and can make this contact aware of any additional risks identified locally.

Opportunity: Changes in governance arising from the advent of Digital Railway provide increased opportunities for active engagement and the promotion of collaborative working to develop and implement joint solutions. Train operators should familiarise themselves with their owning group Operations Council representative and can make this contact aware of any additional opportunities identified locally. ATOC's role within this is to represent TOC views within the DR programme, so that the governance that is adopted takes account of TOC needs, promotes and recognises good practice and allows TOCs to engage and collaborate with the programme.

5.2 Network Rail Route Governance

With Network Rail having introduced a devolved line management organisation structure, each Route is accountable and responsible for its part in delivering NOS. Most Routes offer their own governance structure with a Route Steering Group or Board at the top. Train operators should be aware of the structures within their Routes and ensure that they participate as required to provide opportunities to mould the NOS proposals to ensure they are customer-focussed and compliment franchise obligations. For a train operator that interfaces with a number of Routes, it is recommended that it should receive invitations to and papers for relevant meetings, even if it is unable to attend each and every relevant one. Consideration should be given to sharing meeting attendance with other companies within the same Owning Group, or affected by the proposal(s), to provide economies of resource, subject to each train operator being satisfied that the representation is able to express its views adequately.

In conjunction with NR, train operators should consider the continuation of Route governance meetings beyond the implementation phase, to provide a firm foundation for continued dialogue and a means for introducing further changes, whether technology, roles or processes.

5.3 ATOC Governance

Through its established architecture, ATOC provides its own governance to review and steer TOC participation in NOS. In the case of ERTMS, this is achieved via a dedicated ERTMS Steering Group, whereas for other aspects of NOS (including TM) other, more established, groups such as Operations Council provide the necessary governance. This allows other parts of ATOC to be brought in as necessary, such as National Rail Enquiries, with its Customer Information Strategy Board.

Risk: Changes in governance arising from the advent of Digital Railway could reduce the ability of train operators to engage effectively with the programme. Train operators are able to place more reliance on Route governance arrangements and should satisfy themselves that these are understood and that there is active engagement with these at an appropriate level. Train operators should familiarise themselves with their owning group Operations Council representative and can make this contact aware of any additional risks identified locally.

Opportunity: Changes in governance arising from the advent of Digital Railway provide increased opportunities for active engagement and the promotion of collaborative working to develop and implement joint solutions. Train operators should familiarise themselves with their owning group Operations Council representative and can make this contact aware of any additional opportunities identified locally. ATOC's role within this is to represent TOC views within the DR programme, so that the governance that is adopted takes account of TOC needs, promotes and recognises good practice and allows TOCs to engage and collaborate with the programme.

5.4 Train Operator Governance

It is recommended that each train operator develops a governance structure to consider, review and respond to NOS as it sees fit. This could be discharged by a dedicated project team to support NOS, or by an addition to established internal governance groups as necessary. Developing an internal structure to support NOS is recommended, as (in almost all cases) train operators cross Network Rail Route boundaries, so reliance on participation with any one particular Route may not provide a complete picture.

Consideration should be given to sharing meeting attendance with other companies within the same Owning Group, or affected by the proposal(s), to provide economies of resource, subject to each train operator being satisfied that the representation is able to express its views adequately.

6. Rail Operating Centres (ROCs)

6.1 Introduction – how many, when & where, high-level philosophy

As part of NOS, Network Rail will progressively migrate and consolidate signalling and Route Control into state of the art Rail Operating Centres (ROCs). Twelve of these are located geographically, with each Network Rail Route having at least one. Most of the ROCs will also house Electrical Controls, as part of proposals to co-locate these with signalling and Route Controls.

Route	Centre	Build	Status
Scotland	Glasgow	Existing	
	Edinburgh	Existing	
London North Western	Manchester	New build	Open and occupied
	Rugby	New build	Awaiting occupation
London North Eastern & East Midlands	York	New build	Open and occupied
	Derby	Existing	
Wales	Cardiff	Existing	
Western	Didcot	Existing	
Wessex	Basingstoke	New build	Under construction
Sussex	Three Bridges	New build	Open and occupied
Kent	Gillingham	Existing	
Anglia	Romford	New build	Open and occupied

The rationale behind the ROCs is that, by co-locating individuals involved in the operation of the railway, information flow is improved allowing better quality and faster, more consistent, decisions to be made. A higher quality working environment will be provided for staff, reducing reliance on traditional buildings and removing (over time) the need for numbers of signallers to work alone. Additionally, the numbers of staff involved in such decisions can be reduced, providing a significant cost saving to Network Rail.

This rationale may also extend to bringing Station Controls (whether NR or TOC managed) into the purview of the ROC where appropriate, to cement closer working with associated operations staff, and using technology to ensure continuity of communication with station-based personnel.

Six of the ROC buildings are pre-existing and will be modified to suit their new role. The remaining six are being purpose built. A common specification has been prepared by Network Rail to set down minimum standards for each of the buildings to attain: the purpose-built

buildings will all meet these standards, whilst existing structures will be modified, so far as is practicable.

These pictures illustrate the outside of one of the purpose built ROCs and how co-location of personnel involved in differing activities might look.

As good practice, a number of Routes have established ROC User Groups, consisting of representatives from signalling, NR control and electrification control, together with train operators, especially those that intend to co-locate. Such groups provide opportunities to develop proposals on how to introduce the ROC, including staff accommodation, layouts, security and domestic considerations, together with change management. As part of their engagement with NR, train operators should consider whether such groups should meet on a "task and finish" basis (i.e. to oversee introduction of the ROC) or should continue once the ROC has been successfully introduced.

6.2 Principles of Train Operator co-location

Experience has shown that there is often industry benefit from closer integration with NR, either to reduce man-marking or to simplify both decision-making and communication links. The advent of technology, however, especially Traffic Management, allows closer integration to be achieved without physical co-location. Nevertheless, given the current pace of introduction of these technologies, train operators may wish to consider co-locating with NR within a ROC environment.

Opportunities exist with each ROC for train operators to consider co-locating, to take advantage of closer working relationships with their NR colleagues. As a minimum, the co-location would apply to train operator train service personnel (controllers), although the operator may wish to consider what additional roles and activities need to be performed that could be beneficially discharged in the same location. In some cases, this might include customer information and social media support staff.

In a number of respects, any decision is easier for those TOCs that are currently co-located with Network Rail in a NR-provided building.

Some of the factors for train operators to consider are (in no particular order):

a. The extent to which the ROC in question meets the operational needs of the operator, bearing in mind that (in almost all cases) the entirety of the operator's operation will not be covered by a single ROC;
b. The suitability and headcount implications of potentially having a train operator presence in one or more ROCs;
c. The benefits the train operator might enjoy by co-locating to a different location, for example within the company headquarters building or those of an important co-ordinating transport authority;
d. Where train operator staff will be located within the building, which could be on the operational floor alongside NR colleagues or in a separate room, and whether sufficient staff members to meet the operator's needs can be accommodated;
e. Any franchise or commercial obligations;
f. The anticipated attrition rate amongst experienced train operator Control staff moving to a new location;
g. The extent to which existing or previous experiences of collaborative working with NR may change;
h. The advantages of locating train operator personnel within a building that meets modern day workplace requirements (e.g. locker space, faith rooms, manned reception areas) and affords staff with a better working environment;
i. Any implications for Disaster Recovery and/or Business Continuity (i.e. on the one hand, factors such as improved business resilience through locating in a more secure building, with robust power supplies and security; on the other, consideration of whether NR is offering an alternate site in the event that the ROC itself is unavailable in full or in part);
j. Cost considerations for space occupied, transfer costs of affected staff and any ongoing or one-off IT costs; and
k. In the event that a train operator is not co-located, the ability of that company to interface with the ROC to avoid creating additional barriers to effective service management.

ATOC has developed a short presentation to explore these further - see Appendix A.

6.3 Managing moves to ROCs & risks to train operators of moving to a ROC

Whilst NR can be expected to co-ordinate overall arrangements, train operators have a responsibility to identify and where necessary advise NR of particular considerations or requirements that need to be met. These can best be dealt with in a systematic way, by identifying the needs of the staff who are transferring and confirming what will be provided by NR on arrival and subsequently. Train operators should participate in any NR led meetings that are established to manage the ROC moves. It is a good idea for a train operator to appoint a Project Manager to manage the move or to appoint key individuals to attend to specific aspects, to provide a consistency of approach and dialogue and for there to be an agreed budget to work to.

Prime amongst the factors and risks to be managed as part of the move are (in no particular order):

a. Ensuring continuity of IT and Telecoms support for train operator systems;
b. Understanding the management structure within the new location and ensuring affected TOC staff are briefed on any applicable Health & Safety or Premises requirements;
c. Whether any changes are required to the management of train operator services in an area not covered by the ROC;
d. The extent to which additional train operator costs (including software or licences) are to be recompensed by NR or another party, either as a one-off or on an on-going basis. [*It should be noted at this point that the moving of a train operator control into a ROC is not expected to lead to the application of Network Change, so a separate deal will need to be reached between parties. Such an agreement should be reached contractually prior to any migration and based on ensuring cost neutrality for the train operator. Where TOCs currently co-locate it is expected that the existing property agreement between the parties will identify the mechanisms that will apply to recompense additional costs arising from the move of location*];
e. Identifying the key strategic & operational reasons for moving, with key milestones and dates agreed with NR;
f. Relationship with franchising authority and any implications that co-location may have on franchise agreements/committed obligations;
g. Having an exit strategy for the currently occupied space;
h. Ensuring the new space to be occupied meets any train operator Health & Safety or ergonomics requirements;
i. Identifying any required staff changes and ensuring affected staff are adequately briefed and consulted; and
j. Communicating the changes within the train operator and to any relevant third parties (e.g. fleet maintenance sub-contractors).

Checklists for managing office moves can be found on the internet.

Risk: That the needs of the train operator are insufficiently recognised and hence the arrangements do not properly reflect the best interests of that operator. It is worth noting that

train operators may lose experienced and talented staff and may therefore require a robust recruitment and training plan.

Opportunity: Co-location provides the opportunity to improve working relationships with NR staff, in a high quality working environment, reducing man-marking in future, and providing more consistent and improved recoveries from perturbation.

6.4 New franchises – transition to ROCs & NR lobbying (to DfT) to increase co-location

It can be expected that new franchises may be specified by the franchising authority to be co-located with NR in a particular ROC. In this circumstance, it is reasonable to assume that the costs and risks associated with such a co-location requirement will form part of the response provided by the successful bidder and subsequently enshrined in the resulting franchise agreement.

Whilst a bidder might include a costed plan to achieve co-location, it is possible that a separate non-compliant element might be included in a franchise bid if the bidder considers that the interests of the franchise are served better by adopting a different location for the TOC control.

Documents placed in the respective data-room are likely to provide information on whether co-location into a ROC is expected. Principal amongst these will be the Invitation to Tender provided by the franchising authority together with any supporting briefing documents. Placing these in the data-room ensures that all bidders for the franchise are treated equally and have equal opportunity to develop a plan and identify costs, etc.

With NR having made the strategic decision to move its signalling and operational and electrical control activities into ROCs, it is feasible that NR may seek to influence the franchising authority when it comes to specifying where a new franchise's control functions should be located. Bidders for a new franchise may be consulted over whether that level of detail should be included in the ITT (against which all the bidders develop their plans and frame their tender responses). Incumbent operators may also be included in any consultation.

Risk: That NR may wish to see a re-franchised TOC co-located within its ROCs, without necessarily being aware of the overall best interests of the TOC

Opportunity: A thoroughly planned and meticulously executed ROC co-location provides significant opportunities to improve staff engagement and train service delivery to customers

6.5 Business Continuity & ROC security

Government advice defines Business Continuity Management (BCM) as being about identifying those parts of an organisation that it cannot afford to lose – such as information, stock, premises, staff – and planning how to maintain these, if the event of an incident. Any incident, large or small, whether it is natural, accidental or deliberate, can cause major disruption within an organisation. The emphasis is on planning in advance, rather than waiting for an event to

happen, to facilitate a return to business as usual in the quickest possible time. This recognises that delays could mean an organisation loses valuable business (and customers) to its competitors, whilst facing increased costs (including losses in confidence or to reputation).

An introduction to Business Continuity can be found at:
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/137994/Business_Continuity_Managment_Toolkit.pdf.

The concentration of activities within a ROC means that any threat to the building, services or staff could give rise to considerable disruption to trains. In consequence, NR has developed a base specification for the ROCs that acknowledges their importance to the rail industry. Examples include duplication of power supplies and enhanced fire protection arrangements. At the time of writing, it is not clear whether the buildings will be designated as Critical National Infrastructure (http://www.cpni.gov.uk/) and thus subject to more than just NR oversight.

Those train operators co-located within a particular ROC should be clear about where they would re-locate to in the event of the loss of that ROC, and how they would continue to manage rail services that were able to continue (for example, those operating within the geographic area covered by another ROC). It may be that the train operator can reach agreement with NR for a joint disaster recovery facility, or it may be that it would prefer to make its own arrangements.

In considering alternative disaster recovery facilities, train operators should understand the extent of service provision that NR would be able to offer in the event of partial or total loss of a particular ROC. In some cases, the ROC may house signalling equipment (for example, interlockings) that are not replicated on the lineside, the loss of which would seriously hamper the ability to run any train service.

Risk: Although co-locating vital signalling equipment, for example interlockings, within the ROC offers benefits in terms of minor fault rectification (avoiding the need to visit remote locations), the consequence of any catastrophic loss of all or part of the ROC may be an inability to run substantial numbers of trains for a considerable time. Train operators should engage with NR to understand the mitigations that are in place to prevent loss of a ROC and form a view on the adequacy of the arrangements.

6.6 Network Change

The advent of ROCs does not change the way in which the Railway Operating Code is applied so the following table summarises the expected position with regard to Network Change and its application to ROCs:

Construction & introduction of a ROC	Unlikely to require issuing of a Network Change, unless construction requires the closure of a siding or part of the Network
Migration of Route Control and/or TOC control to a ROC	Covered by existing property agreements and not requiring Network Change proposal
Migration of signalling to a ROC accompanied by re-signalling	Network Change required
Migration of signalling to a ROC achieved by re-control from existing location	Good practice suggests Network Change required. At the very least NR should issue a No Material Effect letter, which can allow challenge by train operators, who should have regard to changes in operational processes, risks and opportunities brought about by the concentration of signalling into a single location
Migration of Electrical Control to a ROC	Unlikely to require issuing of a Network Change, unless telephone contact numbers or geographical responsibilities change
Migration of Station Control to a ROC	Good practice suggests Network Change required. At the very least NR should issue a No Material Effect letter, which can allow challenge by train operators
Changes to Route or geographic boundaries between ROCs	Good practice suggests Network Change required. At the very least NR should issue a No Material Effect letter, which can allow challenge by train operators

7. Traffic Management

7.1 Introduction – what is TM?

The term Traffic Management (TM) describes the roles (people) and processes employed, together with the control systems and associated decision support tools (including telecommunications, data, software and hardware), which will facilitate real-time execution and optimisation of the plan with the resources available, and thereby permit the ROCs to manage their geographic responsibilities more efficiently. These roles, processes, systems and tools introduce greater automation and consistency of task completion, together with enhanced prediction and resolution of conflicts, whilst combining improved co-ordination during perturbation with better just-in-time planning.

The high-level aims of TM are to join up signalling and control into a single activity and automate some current tasks, to enable more rapid and effective decision-making, improved real-time service management, and swifter service recovery following disruption, by providing:

a) integrated signalling and control functions;
b) a forward view of the train plan that is being applied on the day;
c) decision support tools to enable real-time planning/prediction and resolution of conflicts;
d) a single operational information system, providing consistent real-time information to passenger and freight customers, particularly during times of disruption; and
e) reconfigurable areas of control to enable efficient workload management

thereby realising a significant reduction in reactionary delay and improving information to passenger and freight customers, particularly during times of disruption.

TM will be delivered from the ROCs, each of which will serve a large geographical area. Ultimately, TM will be largely automated, with the system performing repetitive tasks and managing the train service in accordance with a set of pre-defined rules. It will make regulating decisions based on forecast train movements, and will be controlled by a small team of skilled operators. The technology will optimise the use of the existing infrastructure and capacity with no adverse impact on performance. It will be open and flexible, and will not be wedded to any specific underlying current or future signalling solution.

In considering how to deploy TM, NR created an architecture map that, at a high level, illustrated how TM would co-exist with existing IT and signalling systems within the industry. The component IT systems would either provide TM with information to support future decision-making or would receive information concerning the consequences of decisions that had been made (see figure 1 below). Where such systems are unable to exchange information currently, NR intends to introduce middleware, called the Layered Information Exchange (LINX). To allow TM to control signalling interlockings, a second piece of middleware (known as the Remote Interface – RIF) would be introduced.

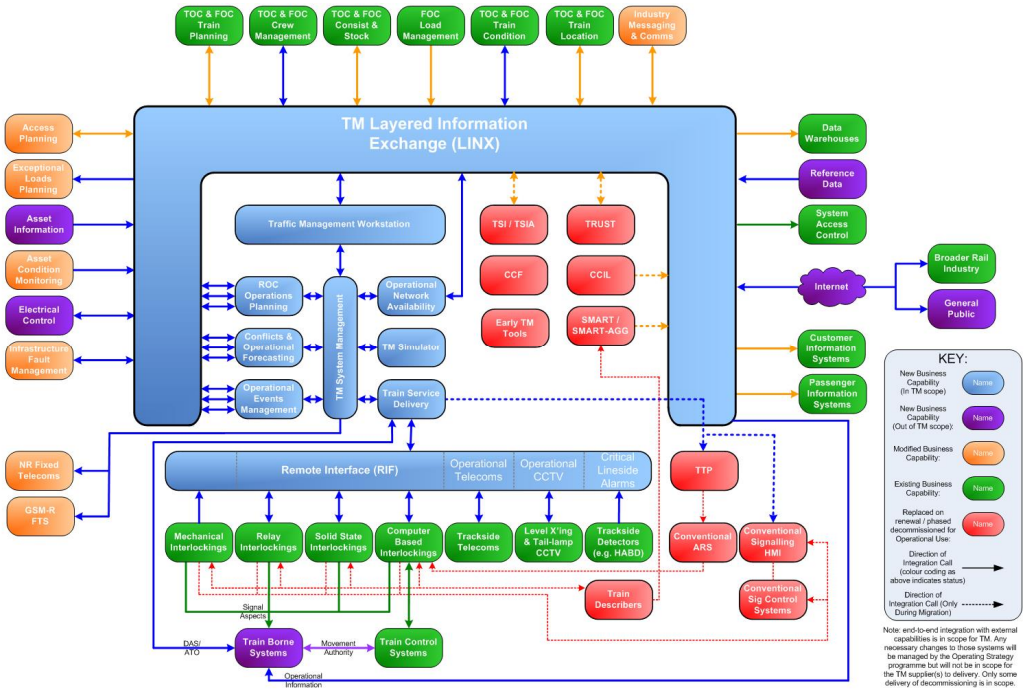


Figure 2 – TM architecture

The overall vision and mission for TM is to reduce reactionary delay minutes and improve capacity utilisation for the GB railway, using the best people, most efficient process and proven technology. A Concept of Operations (ConOps) sets out the vision for TM and outlines the strategy for its delivery. It has been developed through consultation with an extensive range of rail industry stakeholders and informed through research into systems in other countries, and will continue to evolve throughout delivery of the project. The ConOps describes an end-state that a future version of TM would achieve, so need not apply to all deployments of TM before that end-state is reached. As yet, the ConOps has not received industry approval, so will need further refinement to record new good practice and technological advancements, and the learning experiences from initial deployments of TM. The current version of the

document is embedded here. Concept of Operations for Traff

Although not referenced as such in the ConOps, a TM system that enables the train plan to be managed in real time and which allows that train plan to signal trains directly via the relevant interlockings is known as "**integrated**". Such a description marks the most sophisticated form of TM. Less sophisticated forms may also be deployed, especially in the early stages of national roll-out, and can be described either as "**isolated**" or "**interfaced**", where:

- **Isolated** describes a system that operates independently of other signalling and control systems and simply provides guidance to a signaller / controller, using available information, via a separate display screen); and

- **Interfaced** describes a system that offers some (but not all) of the functionality of an integrated system, but also has some characteristics independent of the signalling and control systems.

7.2 Supplier selection and deployments

7.2.1 Supplier selection and agreed deployments

Following consideration of the available technologies and suppliers, NR reduced its choice of potential suppliers to three – Thales, Hitachi and Signalling Solutions (SSL). Detailed discussions gave rise to three prototype systems – one per supplier – that were subject to exhaustive evaluation in late 2013 by front-line support staff – both controller and signaller, including TOC personnel – completing a range of scenarios and test scripts, in a hands-on environment, over a three-month period. Evaluation sought to validate the assumptions made by the TM programme, including the Concept of Operations and the anticipated industry benefits (e.g. improvements to performance).

The presence of TOC personnel during evaluation permitted train operator views to be taken into account by consideration of the communication and engagement required for TM. It also permitted the development of an initial high-level understanding of the impacts of TM on train operators and the opportunities that TM will present.

Following evaluation and refinement of the requirements, NR conducted a detailed procurement exercise which resulted in the choice of Thales as the preferred supplier to support the implementation of TM into the first deployment locations of Cardiff and Romford. These deployments will control lineside signalling and had been due to be implemented in December 2015; introduction is now expected to be in the second half of 2016.

The areas chosen for First Deployment are:

I. the Essex Thameside Line of Route (services between Shoeburyness & London Fenchurch Street) to be controlled from the Romford (Anglia Route) ROC; and
II. the Newport Area Re-signalling Scheme between Severn Tunnel and the approach to Cardiff, including supporting branch lines (as far as fringe signalboxes) to be controlled from the Cardiff (Wales Route) ROC.

Respectively, these will involve:

I. an "integrated" deployment, involving the transfer of signalling from Upminster IECC to Romford ROC for the Essex Thameside franchise area with NR and c2c staff working side by side to consider train service arrangements within the defined geographic area, irrespective of role or employer. Aligning workstations in this manner is referred to as "pod working". Signaller roles will continue to be identified as such, as will Incident Managers, but the opportunity is to be taken to combine the c2c Train Service Manager with the NR Route Controller role, on a trial basis. This largely mirrors existing practice, will support a move towards closer alliancing between the TOC and NR Route and will deal with the majority of re-planning requests required by c2c. Services operated by other companies will continue to be dealt with by the Anglia Route Control, again mirroring existing practice, which will also be located in the ROC. Other changes will see an increased number of c2c staff working within the ROC compared to Upminster, with additional resource provided around information sharing, for example. The Network Change for this scheme has been issued and established following completion of consultation.

II. an "integrated" deployment, involving the transfer of signalling from four existing workstations around Newport (Gwent) to Cardiff ROC. Primarily, this deployment will largely demonstrate the ability of TM to control lineside signalling. However, as an adjunct to this, the plan/re-plan functionality within TM will extend to a wider area within South Wales, although this will not provide physical control of lineside signalling. Although this broader use within South Wales will be an "isolated" deployment, it will demonstrate the usefulness of the plan/re-plan functionality across a wider area. As part of this deployment into Cardiff ROC it is not expected that there will be any changes to signaller, NR controller or train operator controller roles and pod working will not be introduced. A Network Change for this scheme exists in draft form and following confirmation of the revised deployment date will be formally issued.

Each First Deployment will see TM provided in support of four existing signalling workstations, with decision support tools available to better plan and re-plan the train service, resolve pathing conflicts proactively and reduce reactionary delay. It will also deliver a single operational information system that will provide improved real-time travel information to passengers and customers that is consistent across all customer information systems.

Details of each of the First Deployments can be found in the relevant Network Change Notification (issued under clause G1 of the Network Code). It is important to note that, at least initially, neither will provide the end-state described in the ConOps as some functionality has not been developed sufficiently or is not being introduced at this time. This is to de-risk the introduction of First Deployment against the operational railway.

Further information on the scope and capability of TM can be found in the "Introduction to Traffic Management", currently being prepared by NR. An embedded version of this document will be inserted into a future version of this document.

7.2.2 Future deployments

To support the development of options in respect of subsequent deployments of TM, NR issued an Invitation to Tender (ITT) in 2014, setting out a likely framework and invited the three suppliers – Hitachi, Thales and Signalling Solutions – to respond. The purpose was to obtain prices and better understand supplier capabilities, which could then inform final deployment and national roll-out options. Once options were determined, NR would then be in a better position to seek approval and funding authority.

For a number of reasons, including emerging prices from the tender responses and the revised approach being contemplated by DR, it was envisaged that any contract awards arising from the ITT would have to change significantly. NR decided therefore to withdraw the ITT. Suppliers were informed of this in March 2015.

NR still considers TM to represent the way forward and to offer industry benefits of reduced levels of reactionary delay, so a revised tender was issued subsequently, this time for the Thameslink Core, and including a priced option for small scale deployment between Leeds and York. Hitachi has been announced as the winner of that contract, with deployment for Thameslink expected in May 2017. Initially this will be an "isolated" deployment.

Deployment plans beyond Thameslink are, as yet, unclear and will be developed as part of the wider Digital Railway programme. Once plans for subsequent deployment are developed, it is expected that NR will include these within its submissions into the Initial Industry Plan for Control Period 6. That, in turn, may lead to the issuing by NR of a Complex Project Procedure Notice (CPPN) Network Change for subsequent deployment; NR will work with representatives of the ATOC ERTMS Commercial Group on the content and timing of that consultation.

It can also be expected that future deployments will take cognisance of the issues identified and overcome as part of First Deployment to ensure that any lessons are incorporated.

For the avoidance of doubt, any CPPN would supplement, rather than replace, any Route-issued Network Change Notices, which will provide details of each Route-based scheme. The ETCS Programme is already following a CPPN path, monitored by the ATOC ERTMS Commercial Group, with consultation on such a document having closed on 22 May 2015. The ATOC ERTMS Commercial Group contains representatives from a number of TOCs, including those well versed in Network Change procedures.

Risk: The extent to which TM will be deployed beyond First Deployment is far from certain at the time of writing. Train operators need to be engaged in any decisions for subsequent deployments. Additionally, the interfaces between adjoining TM deployments, to ensure continuity of information and decision-making across system boundaries, has yet to be fully considered or modelled, especially where different TM suppliers' products are involved. By virtue of the TM deployment being into the ROCs, which are inherently Route-based, ensuring that there is no loss of focus or regulation priority across system boundaries will fall to a central team within NR to determine the best solution.

Risk: Although train operators might consider the deployment of TM to be a material change to the Network, and therefore warrant the issuing of a Network Change Notice, this is not a view shared universally within Network Rail. It is considered that train operators should state a clear view to NR that Network Change applies and that, as a minimum, NR should issue a No Material Effect letter. This will provide the opportunity for train operators to challenge NR's interpretation.

Opportunity: wider introduction of TM will enhance the realisation of industry benefits and provide a consistency of approach to service recovery.

7.3 Managing moves to TM: introducing the Route Operating Model

As part of any consideration of deploying TM, the relevant NR Route and affected train operators must discuss and agree what the deployment is intended to do and how it is intended to achieve that purpose. This is recorded, agreed and published as the Route Operating Model (ROM – may also be known as the Future Operating Model). The purpose of this document is to:

- Describe the operational roles, processes, and technology for TM within the ROC;
- Provide a guide for NR's suppliers involved in the deployment of TM and other related technologies within the ROC; and
- Act as a reference document for subsequent deployments of TM.

The intended audience of this document includes:

- All functions of NR within the relevant Route;
- All functions of affected Train and Freight Operators, whether directly or indirectly affected;
- Traffic Management System suppliers;
- Trades Unions; and
- Safety, standards and other regulatory bodies.

Such documents exist, or are being developed, for First Deployment of TM.

Items for consideration within the ROM include:

- geographic area of control for TM;
- the Area of Visibility for TM (i.e. a defined area within which TM will monitor train movements);
- reference to the Wider Area, beyond the area of control for TM, to provide context and determine the means by which those locations monitor train movements within TM;
- the type of TM to be provided – "isolated", "interfaced" or "integrated";
- the operational roles and organisational structure to support the TM deployment;
- the floor plan for those roles, including any application of pod working;

- training of affected staff;
- description of the process activities to support the organisational roles and system functionality. For First Deployment these will be:
  - Manage and Monitor Train Movements
  - Manage Disruptive Event
  - Re-plan and Recover Service
  - Manage Infrastructure Access
  - Prepare Daily Current Plan
- description of the technology to be provided for NR use (for First Deployment this will include the various forms of ARAMIS (the system being provided by Thales) to be used together with supporting systems such as DICORA (voice communications) and conventional systems such as TRUST, CCIL, FMS and CCF);
- description of the technology to be used by train operators and how that will interface with TM (First Deployment examples include VoyagerPlan, TACT XV);
- the arrangements for Performance Monitoring and Business Continuity;
- how train operators not co-located within the ROC will interact with TM and the ROCs; and
- arrangements to manage the transition from current to TM-enabled.

Train operators should ensure that they are aware of the arrangements to develop and agree the ROM and engage accordingly with NR.

Risk: It can be envisaged that each Route will approach the development of its ROM differently, just as each train operator might be expected to have different ideas and concerns about what it wants. This creates a challenge to those operators that interface with many ROCs. Additionally, the ROM cannot restrict itself to just those train operators who are co-located in the ROC and must include the requirements of all affected operators, including those who enjoy diversionary track access rights.

Opportunity: By being involved in the detailed discussions around how TM is to be deployed within a ROC, train operators have an opportunity to influence NR decisions to their benefit. It should be remembered that, where a ROC deals with more than one TOC, a degree of compromise may be required to ensure all operators receive some benefit. At the same time, train operators will be able to mutually support each other and develop ideas in tandem.

7.4 Changes to NR roles

Over the long term the introduction of TM can be expected to change existing NR signaller and controller roles. The end-state of these is described in the ConOps. For First Deployment, however, NR has chosen mostly to retain existing roles and amend them slightly to take account of minor changes required to operate the new technology; this is to de-risk the introduction of First Deployment against the operational railway. Details are contained within the Route Operating Model.

In one respect, however, the advent of First Deployment at Romford enables a trial to take place with the combining of the c2c Train Service Manager and the NR Route Controller role. This largely mirrors existing practice, will support a move towards closer alliancing between the TOC and NR Route and will deal with the majority of re-planning requests required by c2c. Services operated by other companies will continue to be dealt with by the Anglia Route Control, again mirroring existing practice, which will also be located in the ROC.

Risk: That changes are made to roles or responsibilities without sufficient engagement with the relevant train operators and appreciation of any consequences (for example, changed reporting and liaison arrangements)

Opportunity: to trial different ways of organising controls thereby providing evidence to frame and support future deployments

7.5 Opportunities to change RU roles & headcount

It is not envisaged that there will be any change to train operator roles or headcount caused by First Deployment, although some working relationships may change; this is to de-risk the introduction of First Deployment against the operational railway. Of course, each operator may choose to use the introduction of TM as the catalyst to make changes to its technology, roles or processes. Details will be contained within the Route Operating Model.

By way of example, First Deployment at Romford will enable a trial to take place combining of the c2c Train Service Manager and the NR Route Controller role; the combined role will be jointly funded and will be able to make decisions for all regulating or conflict situations that affect c2c only. Decisions that affect other train operators' services will continue to be made by NR Controller staff, who will have migrated to the ROC but who will not be part of the TM pod working.

As mentioned, a train operator may choose to use the introduction of TM to make changes to technology, roles or headcount as a result of the closer integration with NR staff that will result. This need not apply to train operators who happen to be co-located within the ROC with NR. Whilst the move to the ROC allows an operator to consider its control activities afresh and may allow an increase in support staff, (for example to allow concentration of activities regarding customer information or social media, or the application of new technology (self-funded) to allow remote traincrew sign on/off), it may be that this is, in itself, insufficient to justify changing existing arrangements. As a result the catalyst for change becomes the introduction of TM. As stated above, operators each have differing needs, so are in the best position to determine the changes that can be justified.

7.6 Links between TM and RU stock & crew systems

See also section 7.10.6: *Need for system upgrades*

A core tenet of TOC consideration of TM has been that decision making can only be optimised if information relating to train operator resources (traincrew and fleet) passes in both directions, informing the options that TM proposes and providing visibility of the consequences of any decisions. As a general rule train operator systems at present lack the capability to accept changes to the train plan from TM, without manual re-work, and as such do not help the operator's recovery from perturbation. The extent of any manual re-work acts as a resource constraint on train operators during major perturbation.

Although train operator systems lack the capability to accept changes to the train plan proposed by TM, still less enable the stock & crew resources to be re-worked to support re-management, technological advances mean that this situation can be expected to change over time.

At this stage, full integration between TM and stock and crew systems is not practicable (so is not being proposed for First Deployment) but can be worked towards. It has been recognised that there are probably four stages on the journey, from completely independent systems at one extreme to fully integrated and seamless transfer of information at the other.

To support traincrew and fleet information being available to TM, NR is developing the specification for a Layered Information Exchange (LINX). This middleware will enable train operator systems to talk to TM. LINX will do more than this, and will enable a number of industry legacy systems to share information, filling a need that has existed for some years, which TM alone cannot be expected to fill. Nevertheless the introduction of TM and LINX will improve the current position.

Under current proposals, stock & crew management tools do not form a part of core TM products being provided by NR.

There is no single, consistent view held by train operators over how to improve stock & crew systems. Some have expressed the view that they will procure better systems from third party suppliers, which can sit outside TM and use LINX to share information with TM. Others have a preference for TM itself to provide a stock & crew sub-system, but as mentioned current NR proposals do not see stock & crew management tools forming a part of the NR-provided TM products. That said, train operator needs from a stock and crew system will share a number of common factors and these have been drawn together in a set of requirements which has been approved by the Traffic Management Operators' Working Group (TM OWG). This was developed jointly between train operators and NR and can be used as a baseline by train operators to consider their own needs and to gauge the potential impact of any future stock & crew system provision.

For First Deployment, it has been agreed that the sharing of information from TOC systems would be limited to sharing crew allocation and stock consist information, to enable TM to report conflicts in crew associations with trains, especially when handling perturbations in the plan. If the information is not provided then routes will continue to be set manually for trains where TM lacks the information to set routes itself.

Opportunity: TOCs have agreed to share crew allocation and stock consist information with TM as this is largely in the public domain already, so should not require the use of data sharing agreements. The greater the amount of accurate data shared with TM, the better the quality of proposals that TM can make and the more conflict-free the daily train plan can become. Nevertheless, it has to be recognised that not all train operators may be prepared to share full information on their train services, so TM has to be capable of working with different levels of information provision. The advent of TM and the associated introduction of LINX provides the opportunity for train operators, both present and future, to contemplate improving the stock & crew management systems that they use.

7.7 Improving the quality of the daily operating plan

For the avoidance of doubt, the first deployment of TM does not change the way in which the Railway Operating Code is applied so existing Long Term Planning (LTP), Short Term Planning (STP) and track access contractual processes are unaltered. Under a future deployment of TM, there may be an aspiration for changes to be made to the Railway Operational Code but these have not been introduced, discussed or agreed. Also, it is certain that changes will need to be made to the granularity of information contained in timetable bids and offers, to match the ability of TM to process such detail more effectively.

TM provides the capability to use the plan / re-plan functionality to identify and then resolve conflicts between train paths (either direct clashes or insufficient margin between trains). This extends to platforming arrangements as well. The intention is to download the agreed timetable into TM and then de-conflict it as necessary, with collaboration between NR and affected train operators. This will provide a workable daily operating plan that can be used to run the railway against, with changes visible to all but still measured (for performance monitoring purposes) against the agreed timetable. This recognises that there are, at present, occasional errors within the timetable produced as part of the LTP and STP processes, either because of inadequate or misaligned train operator bids or insufficient rigour in the validation of those bids.

The daily operating plan will be further improved under TM by ensuring that VSTP (Very Short Term Planning) paths are subject to similar levels of rigour as applied to LTP & STP. The single determining factor will be “is there a workable path available or not?”

But the operating plan is more than just a collection of train paths. It also needs to recognise the importance of stock & crew resource constraints that are needed to support any given train path. It is expected that stock & crew considerations will be included in future TM deployments, either as data feeds from existing train operator systems (the most likely option) or as a discrete part of TM itself.

For First Deployment in Romford, c2c and NR have agreed that TM will have limited stock and crew conflict detection. In this case, TM will know if an association (a resource’s next planned working) has been broken or if a driver hasn’t been allocated to a service. c2c’s crew management system will subscribe to messages from LINX to assist the TOC in re-allocating crew.

Risk: The cut-off between the end of the LTP & STP processes and the start of de-confliction within TM has yet to be defined. Picking a time too far removed from the date of delivery risks a number of STP path requests not being included in the timetable under consideration by TM. Conversely, if too short a time is adopted, there may not be sufficient time to accomplish all de-confliction. Additionally, de-confliction needs to consider stock & crew factors but (for First Deployment at least) TM will not be provided with real time updates of this information - this is to de-risk the introduction of First Deployment against the operational railway and ensure the key activity (efficient control of the signalling) is accomplished on time.

Risk: To provide the most comprehensive daily operational plan possible, all moves on the network will require an agreed path. This will require timetable bids (most likely VSTP) for all short distance moves that are completed currently by local arrangement with the relevant signaller. This has the potential to include platform shunts and short notice moves on/off depots, as well as short distance light engine movements. The extent to which such local arrangements can continue to be accommodated under TM needs to be defined within the Route Operating Model. Any increase in the quantity of timetable bids will need to be resourced by both the train operator and Network Rail, and backed up by front-line operational disciplines, but has the advantage that the process of de-conflicting will clearly show whether a proposed path is practicable within TM and thus confidence in the eventual path in question is improved.

Opportunity: De-conflicting the operating plan in advance allows issues and concerns to be raised and resolved in advance. This reduces the incidence of delays due to train planning issues affecting the delivery of the daily operational plan, providing greater clarity to staff, passengers and other users as necessary. Resolving in advance also reduces the need for reactive manual input, allowing more timely and higher quality decision making, improving the consistency of delivery and the communication of changes. De-confliction need not be confined to "integrated" applications of TM; both "isolated" and "interfaced" will provide benefits although the results of de-confliction for these applications will need to be manually relayed to the staff who are to enact the decisions.

7.8 Station Controls

The use of the Platform Docker (or similar) within TM provides greatly improved understanding of platforming arrangements for large or complicated stations in real-time, with changes automatically feeding through to the daily operating plan and Customer Information. Slave screens may be of use for local station staff, located away from the ROC. For First Deployment, information from TM will be shared with Darwin, but the latter system is not expected to use his information, until it has been shown to be both reliable and more accurate than the information already available to the system.

Risk: With changes automatically feeding through to the daily operating plan and Customer Information, there may well be a reduction in liaison between ROC staff and station staff before changes are made. This will require station staff to have more faith in information displayed

on CIS screens and may well require greater use of technology to alert such staff to changes, thereby reducing surprises or inadvertent customer mis-direction.

Risk: Changes to the daily operating plan may well be made before it is known that crew and stock resources can be made available to support the alteration, causing confusion as changes that have been automatically communicated to downstream systems are then changed again. Train operators should ensure that any changes to the daily operating plan should only be made with their agreement.

Opportunity: Use of the Platform Docker will provide clear information on the effects of a proposed change and enable good quality discussion with station staff about the practicability of proposed changes.

Opportunity: In some cases, opportunities may exist for station staff themselves to take responsibility for their own Docker, making changes to the daily operating plan that best serve the requirements of the station. Care will be needed to ensure changes do not impact away from the immediate station area and are carried out in accordance with pre-agreed authorities delegated by NR, for example to avoid drivers encountering changes of aspect. Detailed discussion is advised with NR on the practicability of such an arrangement and a trial may be necessary to prove the concept before wider introduction.

7.9 Managing Commercial matters

For the avoidance of doubt, the first deployment of TM does not change the way in which the Railway Operating Code is applied so existing planning and contractual processes are unaltered. Under a future deployment of TM, there may be an aspiration for changes to be made to the Railway Operational Code but these have not been introduced, discussed or agreed.

7.9.1 Effect on delay attribution & schedule 8 payments

See also paragraph 7.7: *Improving the quality of the daily operating plan*

At least initially, there will no formal link between stock & crew systems and TM for real-time updates. This represents little change on current arrangements. TM may well be able to identify service recovery options faster and more effectively, but these will still require agreement before being implemented as the means to achieve service recovery. As such, the deployment of TM acts as an aid to decision making rather than the means of achieving it. Moving from this position requires train operators to improve the systems that they use to manage stock & crew (see section 7.9.6 *Need for Systems Upgrades*).

Risk: Train Operators need to be alert to the potential risk of attribution shift. NR has yet to make any proposals that would alter existing attribution arrangements. Consultation with the Delay Attribution Managers Group (comprising TOC representatives with FOCs invited) has highlighted one possible area of concern that would warrant further research: if NR were to consider that train operator resource management is ineffective or is inefficient when

responding to perturbation. In advance of any work to develop this, it should be noted that TM itself does not alter:

a) *the amount of "spare" resource that a TOC might have available to help respond to an incident;*
b) *the commercial judgment on the suitability of that provision;*
c) *the flexibility of such resources to be utilised at short notice;*
d) *the approach of a TOC to managing an incident in the best interests of its customers.*

7.9.2 Network Change

See also paragraphs 7.2.1: *Supplier selection and agreed deployments* and 7.2.2: *Future deployments*

Although there have been discussions between Network Rail (at programme level) and ATOC in respect of Network Change, only one formal document has been issued. This is a Network Change Notice issued under Network Code clause G1 for first deployment of TM in Anglia. As well as describing the extent of TM deployment and consequential changes to roles within a TOC (c2c) and NR, this also introduced the change in signalling control from Upminster IECC to Romford ROC. As at December 2015, no Network Change had been issued for the Wales First Deployment, although it is proposed that one will be issued when a revised deployment date is agreed.

Risk: Although train operators might consider the deployment of TM to be a material change to the Network, and therefore warrant the issuing of a Network Change Notice, this is not a view shared universally within Network Rail. It should not be assumed that the issuing of a Network Change for the Anglia First Deployment of TM provides a precedent, although this may be an argument that can be employed in future. It is considered that train operators should state a clear view to NR that Network Change applies and that, as a minimum, NR should issue a No Material Effect letter; this will provide the opportunity for train operators to challenge NR's interpretation.

Opportunity: The issuing and subsequent establishment of a Network Change proposal provides a very transparent view of what the scheme involves, who is affected and when changes will occur. The process provides the opportunity for consulted train operators to seek clarification of any aspects that are unclear. But, it has to be recognised that there should be nothing written in a Network Change proposal that comes as a surprise to any train operator, as all such matters should have been discussed and agreed in advance through engagement groups and documents such as the Route Operating Model.

7.9.3 Recovery of costs for use of resources & collaboration

Train operators are rarely resourced to be able to engage with every aspect of a proposal that seeks to change mutual ways of working. Where operators are not resourced to an appropriate level, discussions need to take place with NR to see if funding can be identified. The issue of a Network Change may assist in this regard, as it provides a mechanism to identify and pay for resources required by the operator. At this point, it is worth reiterating a core tenet of any recovery of cost, namely that the activity in question or the resources carrying out

that activity must be additional to the normal work of the train operator. This would normally preclude any claim for the recovery of management salaries, unless there is a clear demonstration that the work in question could not be undertaken by a post holder within their normal working week.

Risk: That the TOC will not be sufficiently resourced to engage meaningfully or efficiently with NR, meaning proposals that are developed do not take proper account of the needs of the train operator.

7.10 Managing Operations matters

7.10.1 Sharing of data between RU systems and TM

See section 7.6: *Links between TM and RU stock & crew systems*

7.10.2 Impact on Regulation Policies

TM provides the capability to have existing, agreed regulation policies pre-loaded into the plan / re-plan application, simplifying the task of determining the order of trains through pinch points, and allowing more consistent application. Ultimately, this could be an automated task, given that train operators will have agreed the policies in advance. It follows that, to be of use, agreed policies must be up to date and relevant to the location and services in question. This does not preclude the ability to alter regulation on the day, either by amending the daily operating plan in advance or by manual route setting. The aim of TM is to reduce the instances of manual route setting to a minimum.

It is expected that the Route Operating Model will set down how documented regulation policies will be programmed into and used by TM, and how this detail will be maintained, with train operators involved in and agreeing with the process.

Risk: Not all NR Routes have or support the use of regulation policies currently so these may need to be written and agreed.

Opportunity: More frequent and consistent use of agreed policies will create confidence in the policies themselves and improve train service delivery. Using the technology to provide a more frequent and consistent use of the policy may expose flaws in a policy itself which will need to be corrected.

7.10.3 Impact on Contingency Plans

TM provides the capability to have existing, agreed Contingency Plans pre-loaded into the plan / re-plan application, simplifying the task of identifying suitable train paths during perturbed working. Furthermore the effect of such train paths will be seen on the Network as a whole, including potential conflicts with train paths outside the area affected by the perturbation. It follows that, to be of use, agreed Contingency Plans must be up to date and

relevant to the incident in question. This does not preclude the bespoke creation of plans to address incidents where there is no suitable agreed alternative.

As part of First Deployment, no change is envisaged to the principle that Contingency Plans are only implemented with the agreement of all parties, and therefore remain subject to resources being available. However, the relative ease with which revised train paths can be identified is expected to lead to a more frequent and consistent application, when circumstances dictate. As there are no firm proposals for future deployments, as at December 2015, this position is not expected to alter.

Risk: The ease with which TM can store agreed contingency plans and alter these to suit on the day will require train operators to have similar, supporting plans for managing their resources and/or a similar capability to resource plans in real-time. Whilst this ignores the practicality of developing fully resourced plans to cover all situations, operators will need to be alert to the risk. It should be noted that TM itself does not alter:

a) *the amount of "spare" resource that a TOC might have available to help respond to an incident;*
b) *the commercial judgment on the suitability of that provision;*
c) *the flexibility of such resources to be utilised at short notice, or by time of day;*
d) *the approach of a train operator to managing an incident in the best interests of its customers; and therefore*

the need for the train operator's contingency plans and incident response to reflect the commercial interests of the operator and the need to move people (or goods), safely and effectively.

Opportunity: As TM is deployed more widely over time, the benefits of being able to see, and where necessary correct, the conflicts created by the adoption of a contingency train plan become greater. This should lead to improved industry performance by insulating unaffected trains from those impacted by an incident, or at least improving dialogue between train operators prior to the adoption of a plan. Additionally, in being mindful of the risk described above, train operators may see additional business justification for improving their existing resource contingency plans or stock and crew management systems.

7.10.4 Changes to VSTP arrangements

TM provides an inbuilt capability to plan or re-plan the daily train service and thereby ensure paths are conflict free (i.e. will work). This applies equally to altered services, whether amended in advance because of changed need or amended following perturbation, as well as to additional services. Where TM is "integrated" with the signalling, this allows additional or altered train services to be known to the signalling and taken into account when performing

tasks such as automatic route setting [2]. As TM is rolled out, it is envisaged that the Very Short Term Planning train path arrangements will change and move to provide a more efficient process than that which exists currently, whilst preserving the principle that VSTP paths must be bid for by the train operator and validated by Network Rail.

First Deployment provides an opportunity to introduce an arrangement whereby VSTP paths solely within a TM geographic area will be able to be bid for by a train operator and inserted via the plan / re-plan facility. In the absence of this, VSTP bids will need to be managed by NR using Integrale or TSIA as now, a process that will continue to apply to path requests that are not solely contained within the TM geographic area. It is expected that any changes to VSTP arrangements are discussed and agreed in the Route Operating Model.

Note that TM will still provide a capability for a VSTP path to be inserted into the system that is not conflict-free. This may be necessary, for example, if an urgent move is required resulting from perturbation. Such paths will be input on a "best endeavours" basis, as now.

Given that any changes to VSTP arrangements that are introduced by First Deployment will only apply to a limited geographic area, it is not envisaged that there will be any change to existing delay attribution arrangements.

Risk: Train operators need to be alert to the risks that NR:

a) *does not seek to change the current VSTP process and methodology, providing no benefit to operators;*
b) *requires more than one application per train path because TM is unable to interface appropriately with existing systems (e.g. NR Integrale), or because the path request crosses ROC boundaries or the boundary between TM systems provided by different suppliers;*
c) *requires all movements, irrespective of distance, to have a fully validated train path, as this is the only way that TM could manage the train service.*

Opportunity: Changing the way in which VSTP paths are bid for and validated is a major benefit of TM. Using conflict detection tools ensures that the path itself has been subject to the same validation rigour as those bid for and accepted through longer term planning, increasing confidence in the end product (the agreed path) and allowing train crew to be briefed more accurately on that path. In the longer term, opportunities may become available for train operators to bid paths within TM (as part of plan / re-plan) with validation equally visible in the same system. Ultimately, electronic bidding could allow electronic validation, with TM undertaking tasks currently performed manually.

---

[2] *For the avoidance of doubt, the use of integrated TM removes intelligence from traditional ARS (Automatic Route Setting) installations. The intelligence is provided by TM itself. As such, it is more appropriate to use the term IRS (Immediate Route Setting) rather than ARS.*

7.10.5 Keeping train operator systems up to date

Some train operators face challenges in keeping some of their systems up-to-date in real time, especially concerning changes that are made to daily resource plans during severe disruption. Given the inability to predict when such incidents occur, operators have been unwilling to provide the necessary resources in controls to enable this record keeping to take place in all circumstances. This results in deficiencies in record keeping. When train operator systems exchange information with TM in future, there is a concern that TM may propose an incorrect option for consideration as a result of inaccurate or missing information, lengthening the time taken to restore a disrupted train service to normal. In particular, when working with TM, train operators need to find ways to maintain their record of changes to agreed resource plans.

For First Deployment, TM will be informed by a feed of stock & crew data at start of the day. As yet, there are no agreed arrangements to share data more frequently, but these are under consideration.

Risk: As now, failure to keep train operators systems updated with changes made leads to sub-optimal and/or lengthy decision-making by controllers. As TM deployments continue, the reliance on accurate operator data will grow, generating pressure to improve on current practice. Unless systems are improved, this may create an additional resource commitment on the train operator.

Opportunity: Improving current practice and/or systems will improve service recovery through more efficient (shorter or better) decision-making by controllers during perturbation. Audit trails (e.g. for paybill purposes) may also be improved.

7.10.6 Need for system upgrades

Given recent changes brought about by funding issues and DR, there can be no guarantee at this time that NR will be willing or able, in future, to fund upgrades of train operator systems. This is despite the obvious benefits provided to TM from such upgraded systems. It may be preferable, therefore, for those parts of the industry exposed to a re-franchising process to use this to leverage improvements.

To assist that consideration, two recent examples of TOCs reaching agreement with suppliers to improve their existing stock & crew management systems provision are illustrated in Appendices B and C. Each has followed a different approach. In both cases, the opportunity has been taken to use a franchise award (either extension (Direct Award) or competitive tender) to leverage the business case. Neither fulfils the vision of having a real-time management tool for both stock and crew but both improve existing provision and expect to realise benefits.

Risk: Without incentives, train operators will fail to improve their systems for managing stock & crew, which in turn will sub-optimise the options considered by TM as part of service recovery. Whilst attention has focussed on influencing NR to incorporate such developments as a part of

TM development itself, this is no longer considered a viable proposition although the development of DR's deployment plans for TM may allow this to be re-visited.

Opportunity: TOCs have said consistently that the market place should provide improved tools to manage stock & crew considerations, but without any one supplier being in a dominant position. However, the market will require assurance that train operators are considering improvements, to justify developing and offering improved product lines. Using the franchise process to leverage improvements provides the incentives to the train operator and ultimately will lead to demand being seen by suppliers. It should also be noted that improved supplier products need not be developed or offered solely for the GB market, as train operators globally will have broadly similar needs.

7.11 Managing Reputation

7.11.1 Training for affected staff

The Route Operating Model will identify the roles within a ROC that require training to operate TM and users will receive full training on the system to a level appropriate to the role(s) to be undertaken. Training will be conducted using by a mixture of techniques, including simulators, train the trainer and e-learning.

For First Deployment, NR has developed a Training Options Report which is refined as more is learnt about the capability of the TM system being installed. Two basic types of training are envisaged:

- Gold (enhanced) - trainer-led, with simulator experience and designed for those roles that will use the read-write of the plan / re-plan functionality and to provide the competency for users to make safety critical decisions with TM; and
- Bronze – largely e-learning and trainee-led and designed for those roles that will maintain an overview of TM functionality but will not require the competency to undertake tasks within TM. This will be the training provided to the majority of train operator staff.

At Romford, for example, the allocation of training packages by role is summarised as follows:

Gold Training Package	Bronze Training Package
Signaller (TMS)	Customer Information Manager
Train Service Manager (TMS)	c2c Customer Information Support & Social Media Manager
Incident Controller (TMS)	c2c Resourcing Manager
Signaller (TMS) ï Workstation 4 ï Level Crossing Control	c2c Fleet Technician
Service & Infrastructure Manager	Wider area roles

Training will not be provided simply to attain a required level of competency, and will be provided to address softer issues, such as TM Awareness & Communication, Familiarisation, Route and local knowledge, Business and Process Change. As experience is gained from First Deployment, so the training requirements for future deployments can be considered.

Risk: Train operators need to ensure that the Route Operating Model provides sufficient consideration for the training needs of staff who will be using or interfacing with TM. This includes operator staff who are not located in the particular ROC, so may be dealing with TM remotely. With NR roles likely to require greater levels of competency attainment, in order to discharge safety critical responsibilities, there will be temptation to concentrate on providing this training to the exclusion of supporting roles. Flexibility should be maintained, if possible, and training should be approached in a methodical manner to ensure it is completed before go-live. Train operators should also consider with NR any ongoing (post "go-live") need for training to ensure that the technology and revised processes are being used to the optimum or to address individual needs in the light of experience.

Opportunity: Training for TM provides an opportunity to upskill or multi-skill staff so that they can perform a variety of tasks using TM, not just the responsibilities of their substantive post. This will improve staff flexibility and understanding of how the system works.

7.11.2 Collaborative working with Network Rail

Studies and experiences from other projects frequently show that benefits can be obtained from a sharing of the challenges associated with making business or technological change. On the basis that no-one individual or company has a monopoly of good ideas, often the best ideas come from shared understanding and joint developments of solutions. NR cannot obtain the best from TM without engaging train operator staff, using TOC and FOC data, understanding the needs of all parties and developing appropriate workable solutions.

Risk: As deadlines approach there is a temptation to develop quick fixes that address an immediate need but (ultimately) do not stand the test of time. A methodical and planned approach, with joint development of ideas and solutions, appropriately resourced and overseen by joint governance groups offers the best way of avoiding pitfalls.

7.11.3 Improving passenger information

The Customer Information Strategy project plans to interface TM with Darwin. This will connect TM's daily operational plan with the agreed customer timetable, allowing changes made in TM to automatically update Darwin which in turn will provide updates to websites, apps, station customer information screens (CIS) and train passenger information systems (PIS). Almost all station CIS are now connected to Darwin (the rollout is expected to be complete in mid-2015) and the first trains are now running with their PIS fed by Darwin data.

The list of target and available messages from TM for First Deployment has been identified jointly by NR and National Rail Enquiries. Definitions of these messages have been developed (recorded in a TMS LINX Service Catalogue, which sets out what information services will be available for downstream consumers) and some sample messages exchanged to confirm. Initially, up to seven messages have been identified to come from TM, via the LINX, to update Darwin. This list may grow in time and there is also the prospect of Darwin data being used to inform TM of a train's progress, again via LINX.

A number of the messages are received currently by manual processes, such as Tyrell. Connecting TM outputs allows these to be automated, improving accuracy and timeliness to the process of keeping customers updated.

The messages identified to date are:

- **Path Details Message (Current Plan and VSTP)**
- **Train Running Information Message**
- **Train Running Forecast Message**
- Train Journey Modification Message
- Change of Track Message (Informs of change of platform)
- Train Running Interruption Message
- Train Delay Cause Message

[Where those in bold font are confirmed as being available as part of First Deployment; other messages are subject to ongoing discussions within TMS as to their current phasing.]

Risk: The national Customer Information (CI) Strategy may have different priorities to those required to support introduction of TM, resulting in deployment timelines not immediately aligning with planned improvements in CI, possible need for re-work at considerable additional expense and lengthened delivery timelines.

Opportunity: Technology such as TM, properly linked with Darwin, can automate repetitive or simple tasks associated with changes to the daily operating plan, thereby improving customer information and allowing correct information to be displayed to passengers.

7.11.4 Creating and using a risk register

In any project where multiple partners are involved, the development of a joint programme risk register can be found to be beneficial to all parties, by allowing the identification of appropriate mitigations, shared where necessary, and ensuring that the actions of one party do not adversely impact on the subsequent actions of others.

Risk: As part of its project governance, NR could develop and maintain a risk register that fails to recognise train operator risks in sufficient detail to be of value. This could place the operator in an invidious position when considering its part in the delivery of TM.

Opportunity: Train operators should require NR to identify and maintain a joint risk register as part of good programme governance. Such a register should be examined on a regular basis by the appropriate governance group(s).

7.11.5 Ensuring TM works

Primary responsibility for ensuring TM works rests with NR, given the need under First Deployment to control signalling. The focus of train operators therefore needs to be on supporting NR whilst ensuring that operator needs (identification of roles and responsibilities, communicating changes to contact numbers, training, information flows, etc.) are met without being artificially constrained by delays in earlier parts of the implementation.

Risk: As a "junior partner" in the introduction of TM, train operators may find themselves placed in the difficult position that delays in the implementation timescales impose less than ideal constraints on their involvements and preparations. Train operators can guard against this by identifying the chances of this occurring early and taking steps through appropriate project governance to ensure that the agreed stage-gates within the project plan are not passed until any adverse conditions have been rectified.

Opportunity: Collaborative working to develop and implement joint solutions builds working relationships and improves each party's knowledge of the other's business needs. Train operator involvement in project governance meetings can ensure that a robust stage-gate process is agreed and followed.

7.12 Influencing Network Rail

7.12.1 What will roll-out look like & when?

See section 7.2.2 *Future Deployments*

7.12.2 TM disaster recovery & cyber security

Details of the strategies to cover these elements within TM remain items under consideration by NR at this time, in conjunction with its suppliers. At a corporate level, NR is developing detailed proposals in respect of both disaster recovery and cyber security but the fact remains

that any interruption of TM will have severe adverse effect on train service delivery, so focus will be on prevention rather than mitigation. This will govern the extent of future work in these areas.

For First Deployment, the Route Operating Models contain details of agreed contingencies for the loss of workstations or loss of functionality within TM and any additional precautions over cyber security. Access to TM systems will be restricted to prevent unauthorised use with access only available to those staff who have received training. Access to the ROCs will be restricted also to authorised persons, unless on site as visitors with appropriate measures in place to control access to rooms, server rooms, etc.

Risk: Primary responsibility for ensuring adequate measures are in place for disaster recovery & cyber security rests with NR, and train operators must agree those measures that need to be applied by their staff, whether working with TM at the ROC or working remotely. Similarly, train operators must ensure that any additional measures required of NR and its staff for the security of their own systems are incorporated into agreed procedures.

7.12.3 Linking TM systems together

See section 7.2.2 *Future Deployments*

7.12.4 Data management

Overall, it can be expected that the introduction of TM will give rise to an increase in the amount of data and information held in systems, and (via greater connectivity between systems) used by an increasing number of systems. This requires data to be both accurate and complementary, and places obligations on train operators to:

- Ensure information that they are providing to be correct and up to date;
- Ensure that information relating to their operations that is held in systems owned by other parties is formally reviewed on a regular basis by those other parties and the train operator.

8. Reference Material [*not exhaustive*]

1. Romford Route Operating Model, version 2
2. TM First Deployment Training Options Report version 0.7
3. Concept of Operations for Traffic Management version 1.3
4. Various updates to ATOC Performance Forum, 2013-2015
5. Network Change for Romford ROC and TM First Deployment, NCG12015TM001

9. Abbreviations [*not exhaustive*]

ATOC	Association of Train Operating Companies
CaSL	Cancellations and Significantly Late (a measure of performance)
CIS	Customer Information Systems
CPPN	Complex Projects Procedure Notice
DR	Digital Railway
ERTMS	European Rail Traffic Management System
ETCS	European Tran Control System
FOC	Freight Operating Company
IM	Infrastructure Manager
IPT	Integrated Project/Programme Team
NOS	National Operating Strategy
NRT	Network Rail Telecoms
OSG	Operations Steering Group
ROC	Rail Operations Centre
ROM	Route Operating Model
RU	Railway Undertaking
RSSB	Rail Safety and Standards Board
TMOWG	Traffic Management Operators' Working Group
TOC	(Passenger) Train Operating Company

APPENDIX A –

Different models of control co-location (2013 ATOC presentation)

Three models of co-location

ATOC Lead for Operating Strategy

ATOC

Introduction to TOC world

- 19 franchised TOCs; 9 others. Plus the FOCs
- TOCs are free to do what's right for their business but support Operations Strategy
- TOC stakeholders – DfT, PTEs, shareholders, employees, customers
- ATOC = Trade Association - voluntary membership
  - Alerting
  - Advocating
  - Asserting
  - Aligning
  - Assisting
  - Advising

ATOC

Co-locate with NR

- Improving communications: speed and clarity
- Avoidance of phone or e-mail?
- Faster decision making
- Pulling different perspectives together for a common good
- Moving away from compensation driving decision making
- Integration of roles or management structures

ATOC

Co-locate with TOC HQ

- Controllers an integral part of business ethos
- Extra resource
  - to assist in in times of disruption
  - proximity to business teams (commercial, customer services, fleet, safety & performance teams = access to wider information, guidance & business impact = one consistent source of information)
  - Access to senior managers
  - Access to training teams & planners

ATOC

(Co)locate elsewhere

- Reflects different needs, examples:
  - Synergies with wider resource management
  - International or global business drivers
  - Regional preferences to achieve transport co-ordination

ATOC

Common features : the business drivers

- Realising the synergies
- Building the brand
- Changing the culture
- Improving quality of outputs
- Better customer service

ATOC

APPENDIX B – Case Study 1

TOC which has agreed a Direct Award franchise extension: upgrading stock & crew provision

Problem statement

With a 4½ year franchise extension (Direct Award), what can be done to improve TOC management of reactionary delay to incidents (and hence passenger satisfaction)?

Constraints:

Short payback period – little time to develop system capabilities, even with supplier support

Not known to what extent Traffic Management would be deployed to TOC routes or Rail Operating Centres, nor when

Providing controllers more time to make informed decisions and communicate those seen as more significant within next few years than wholesale changes to decision making processes

Requirements

Commercial, Off the Shelf product, with limited need for development

To act as a decision support aid

Include element of future-proofing, so need to work with LINX & TM

Desirable to see in operation, to gauge suitability

Commercials must be acceptable to franchising authority and within Direct Award discussions

Commercials underpinned by targeted improvements in reactionary delay (as measured by minutes, more so than CaSL), with acknowledgement that this would improve customer satisfaction ratings

A system that can improve the speed and effectiveness of decision making during service recovery and during short notice infrastructure restrictions

Improved tracking of spare and unused traincrew

Ability to communicate train service decisions direct to traincrew via handheld devices and receive non-verbal acknowledgement from traincrew

Approach

Market analysis for potential products to meet requirements

Contact potential suppliers and gauge reaction to enquiry

Build on existing systems provision, if possible

Decision

Introduce ATOS Integrale product

Positives

Meets requirements

Provided by existing supplier, builds on current relationships & offers supplier a route to market for a product that has been trialled (& de-bugged) elsewhere.

Support from controller community – builds on existing systems

Improve communications by making more information available to the controller, allowing faster & better quality decisions

Targeting performances improvement - reduced reactionary delays, primarily measured in minutes

For consideration:

Further work required to optimise opportunities provided by LINX & TM, when these become known

Recognition that product is fairly unsophisticated – works with existing system capabilities which are known by controllers. Limited ability to cope with major timetable recasts. But, offers improvements on what is available to controllers today.

APPENDIX C – Case Study 2

TOC which has agreed a new franchise: upgrading existing stock & crew provision

Problem statement

With a new franchise award (over ten years), what can be done to improve TOC management of front line staff to provide business efficiencies and improve service recovery following perturbation (and hence passenger satisfaction)?

Constraints:

No readily identifiable service recovery support tool offered by market

Needs to be kept simple, so should concentrate on start time of shift, shift duration and timing of any breaks

Desire to support existing timetable development and resource identification

Needs to integrate with Traffic Management deployment within Rail Operating Centres

Providing controllers more time to make informed decisions and communicate those seen as more important than wholesale changes to decision making processes

Requirements

Lead to headcount savings (through diagramming efficiency) and free up time of out-based managers/supervisors to focus in compliance

Capable if integration to TM, via LINX if need be

Reduction in controller overload and improved consistency of application of remedial measures

To act as a decision support aid, providing information to enable informed decisions to be made

Capable of providing information to front line staff via tablet, with acknowledgement of receipt of instruction and confirmation that task is complete

Support remote sign on by staff and reduce paper copies of documents (e.g. Weekly Operating Notices)

Improve on current (excel-based) systems

Build on existing approach to timetable development and base rostering and extend via daily alterations towards a vision of real-time management

Provide support for other company systems (e.g. payroll)

Commercials must be acceptable to franchising authority and within franchise discussions

Commercials underpinned by targeted improvements in reactionary delay (as measured by minutes, more so than CaSL), with acknowledgement that this would improve customer satisfaction ratings

Introduce automation of repetitive tasks.

Approach

Determine business requirements, both mandatory & desirable

Contact potential suppliers and invite response to enquiry

Score responses – 60% against meeting requirements & 40% cost considerations

Decision

Introduce Tracsis software and work with supplier to introduce real-time management to existing diagramming and rostering product lines

Positives

TOC able to do own thing & feed NR with results, where appropriate

Can integrate with IBM Intelligent Operating Solution, LINX and TM

No capital upfront costs

Programming against TOC variables (e.g. terms & conditions) can be done systematically and over time – allowing supplier & TOC to smooth resource profile

Meets requirements

Provided by existing supplier, builds on current relationships & offers supplier a route to market for a product that needs to be developed but which would have been developed anyway

Support from controller community – improves on existing systems

Improve communications by making more information available to the controller, allowing faster & better quality decisions

Targeting performance improvement - reduced reactionary delays, primarily measured in minutes

For consideration:

Conscious decision to exclude fleet resources as maintenance thereof is outsourced. No business need to improve as solutions lie elsewhere. Not an issue given homogenised nature of fleet and limited number of locations that stock can be berthed

Further work required to optimise future opportunities provided by LINX & TM, when these become known (e.g. supporting real time timetable creation)

Further work required if business need identified to include fleet management, but scalable

APPENDIX D

Checklist of Train Operator Responsibilities and Actions – Activities moving to a ROC

Item	Activity	Done?
Governance & liaison (Section 5 and sub-section 6.1)	Establish train operator governance and project team (if required)	
	Establish links with all relevant NR Routes & ensure visibility of route governance groups (e.g. ROC User Groups)	
	Establish links with national programme and ATOC structures	
	Maintain oversight across all NR Routes, creating train operator master plan for all planned changes to allow consideration of implications and alignment of timescales to suit train operator needs	
	Agree timescales for train operator deliverables and determine project plan(s) to support	
Co-location decisions (Sub-section 6.2)	Determine if and when train operator roles will move into a ROC – consider factors listed in section 6.2	
	Ensure train operator has answers to relevant factors listed in section 6.2 to enable informed decisions to be made	
	Agree with NR how liaison with train operator will continue and be improved as a result of introduction of ROC, where train operator roles do not co-locate into ROC	
	Understand how any move into a ROC is to be funded and budget for any increases in lease or operating costs	
Managing moves to ROC (Sub-section 6.3)	Agree with NR how liaison with train operator will continue and be improved as a result of introduction of ROC, where train operator roles do co-locate into ROC	
	Establish train operator project team (if required)	
	Ensure train operator has answers to relevant risk factors listed in section 6.3 to enable informed decisions to be made	
	Are train operator staff participating in ROC Management meetings?	
	Do train operator staff know when move will take place and what changes will be expected of them?	
	Is there a management plan to deal with train operator staff attrition, disaffection and any identified training needs?	

Item	Activity	Done?
Business Continuity & ROC Security (Sub-section 6.5)	Have Business Continuity Plans ben updated to reflect any changed locations?	
	Do ROC-based train operator staff know where they would relocate to in the event of ROC non-availability?	
	Is it known how liaison with NR staff normally based in a ROC will continue in the event of ROC non-availability?	
Network Change (Sub-section 6.6)	Is Network Change applicable?	
	Has Network Change been issued and established prior to any changes taking place?	

APPENDIX E

Checklist of Train Operator Responsibilities and Activities – Introducing TM

Item	Activity	Done?
Governance & liaison (Section 5 and sub-section 7.2,2)	Establish train operator governance and project team (if required)	
	Establish links with all relevant NR Routes & ensure visibility of route governance groups (e.g. ROC User Groups)	
	Establish links with national programme and ATOC structures	
	Maintain oversight across all NR Routes, creating train operator master plan for all planned changes to allow consideration of implications and alignment of timescales to suit train operator needs	
	Is train operator represented on TM Operators Working Group?	
	Agree timescales for train operator deliverables and determine project plan(s) to support	
Managing moves to TM (Sub-sections 7.3, 7.4 & 7.5)	Agree with NR how liaison with train operator will continue and be improved as a result of introduction of TM, and how train operator roles will work with TM	
	Establish train operator project team (if required)	
	Is there train operator participation in developing and agreeing the Route Operating Model?	
	Is there an opportunity to change train operator roles and/or headcount?	
	Does the introduction of TM provide an opportunity to upgrade train operator systems (e.g. stock & crew)?	
	Does ROM contain details of: • changes to roles and processes; • any transitional (from current to TM-enabled) arrangements; • interfaces with train operator systems; • the extent to which stock & crew information is to be available to TM; • how identified conflicts between train paths are to be dealt with?	

Item	Activity	Done?
Managing moves to TM (continued) (Sub-sections 7.3-7.8)	Ensure the implications for station controls are understood	
	Do train operator staff know when move will take place and what changes will be expected of them?	
	Is there a management plan to deal with train operator staff attrition, disaffection and any identified re-training needs?	
Managing Commercial matters (Sub-section 7.9)	Is Network Change applicable?	
	Has Network Change been issued and established prior to any changes taking place?	
	Understand how introduction of TM is to be funded and ability of train operator to claim for any increases in system licence or operating costs (unless precluded by other commercial agreements)	
Managing Operations matters (Sub-section 7.10)	Are regulation policies and contingency plans up to date and programmed/loaded into TM and is there a process in place for regular formal review of these?	
	Is there a process for regular formal review of regulation policies and contingency plans that are programmed/loaded into TM?	
	Are changes to VSTP arrangements understood?	
	Ensure any changes to the LTP and STP bids and offers (greater granularity of detail) can be accommodated by systems	
	Ensure arrangements in place to keep train operator systems updated in real time, or that the consequences of not doing so are understood	
Managing Reputation (Sub-section 7.11)	Have train operator training needs been identified with a plan to address these, including extra resources to allow for staff release?	
	Ensure the Customer Information benefits arising from the introduction of TM can be realised	
	Create a risk register to manage train operator risks	
	Ensure the train operator has sufficient time within the overall implementation plan to accomplish what it needs to do	
	Does the ROM include details of agreed cyber security, system security and data management arrangements and is there a process in place for these to be formally reviewed on a regular basis and updated?	