RSSB1601 – Cross Industry RCM programme phase 2 – Commercial

First Presentation - Findings from Industry Consultation

17th July 2013

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Contents

- Introduction
- Current RCM Activity
- Findings
  - TOCs/FOCs/ATOC
  - ROSCOs
  - Infrastructure Providers
  - Train Manufacturers & Maintainers
  - RCM Suppliers & RIA
- Observations and Next Steps

INTRODUCTION

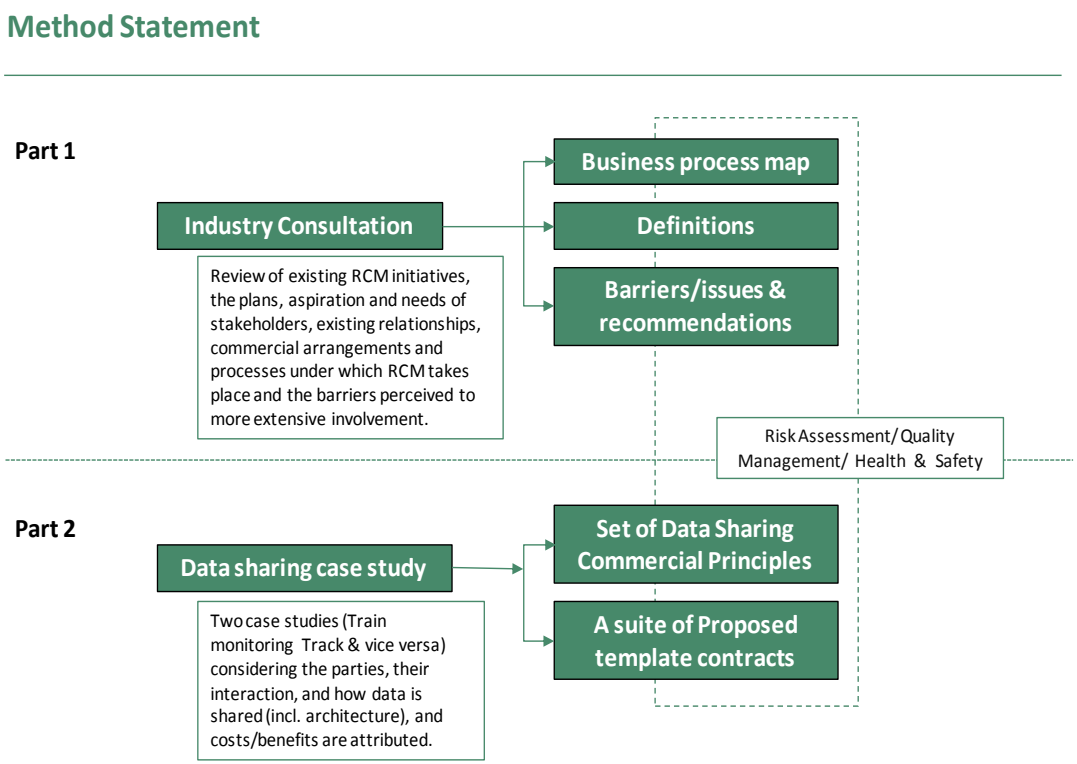
Background

- Use of Remote Condition Monitoring (RCM) can improve asset information (of both rolling stock and infrastructure), system reliability and operational management and lead to cost, performance and safety benefits
- However, there are barriers to cross-industry collection and sharing of RCM data due to the lack of a commonly accepted commercial framework
- As part of Phase 2 of RSSB's Cross- industry RCM programme Interfleet has been engaged by RSSB to prepare templated agreements for cross-industry collection and sharing of RCM data amongst GB railway industry members
- To help us develop templates which can be commonly accepted we have consulted industry stakeholders with an interest in the commercial framework for cross-industry RCM data sharing

Consultation objectives

Our objectives are two-fold:

- To prepare business process maps which will set out the existing relationships, processes and commercial arrangements for cross-industry RCM activity
- To develop a suite of generic agreements as tools to facilitate the adoption of RCM within the industry



Note: The agreements we develop will not be fully defined, but templates including a range of alternatives to suit different types of RCM activity and different cross-industry relationships

Stakeholder engagement

- We engaged with 31representatives of entities within the industry which might be expected to have an interest in the commercial framework for monitoring asset condition and sharing data cross-industry. We obtained responses from or held interviews/conference calls with 80% of them (c.f. our target of 70%)
- The entities we engaged with have been categorised as follows:
  - TOCs, FOCs & ATOC: No. of Individual Responses/No. of Individual Invitations = 8/12: a 67% response rate
  - ROSCOs =4/4: 100%
  - Infrastructure owner/manager/maintainer (Network Rail)= 4/4: 100%
  - Train manufacturers & maintainers = 4/4: 100%
  - RCM suppliers (hardware, software and services) & RIA = 5/7: 71%

Entities consulted

- TOCs, FOCs & ATOC
  - Arriva Trains Wales
  - East Coast Main Line Company
  - East Midlands Trains
  - FirstGroup plc
  - Greater Anglia
  - Northern Rail
  - Southern Railway
  - South West Trains
  - West Coast Trains
  - DB Schenker Rail
  - Freightliner Ltd
  - ATOC
- ROSCOs
  - Angel Trains (2 individuals)
  - Eversholt Rail
  - Porterbrook
- Infrastructure owner/maintainer
  - Network Rail (4 individuals - HQ technical, commercial and Route)
- Train manufacturers & maintainers
  - Alstom Transport
  - Bombardier Transportation
  - Hitachi
  - Siemens
- RCM suppliers (hardware, software & services) & RIA
  - Arrowvale Electronics
  - Balfour Beatty Rail
  - Interfleet Technology
  - Nexala
  - Perpetuum
  - Telent
  - Railway Industry Association

FINDINGS: CURRENT RCM ACTIVITY

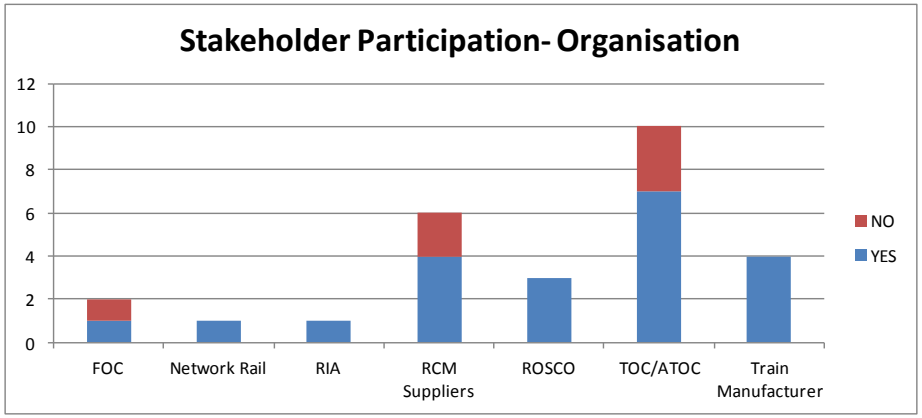
Quadrant diagram of current initiatives

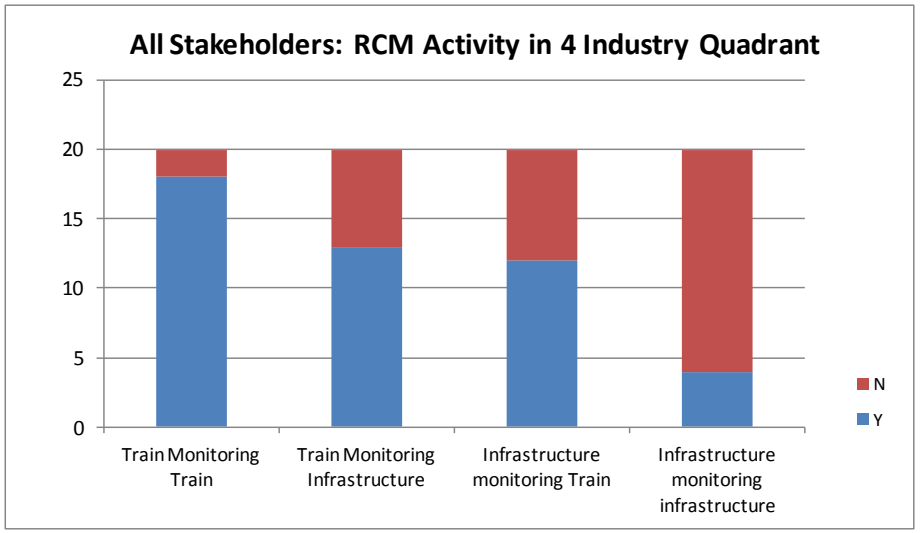
	Train	Infrastructure
Train	• Train Management Systems (TMS) • On Train Monitoring Recorder (OTMR) • Falcon/ Guru • Energyx - electrical energy consumption monitoring. • Monitryx - wheel bearing health monitoring • Greater Anglia on train monitoring system • Southern / Tessalla on train monitoring system • South Eastern traction package monitoring • com@desiro - Siemens Train Monitoring System • Orbita - Bombardier Train Monitoring System • TrainTracer - Alstoms Train Monitoring System	• Unattended Geometry Measurement System (UGMS) • Forward Facing CCTV • New Measurement Train (NMT) • Inferred Track Condition • Unattended Overhead Line Measurement System (UOMS) • Low Adhesion warning system
Infrastructure	• Wheelchex - Wheel Impact Load Detection • Railbam- Acoustic Axle Bearing Monitoring (AABM) • Hot Axle Box Detector (HABD) • Gotcha - wayside monitoring system • Automatic Vehicle Identification (AVI) • Panchex - Pantograph uplift measuring system	• Points condition monitoring • Track Condition Monitoring • Remote temperature monitoring of track. • Various SCADA systems • Various Signalling status monitoring systems.

Note: Some projects might fall in more than one industry quadrant but for the ease of presentation overlapping is not shown here.

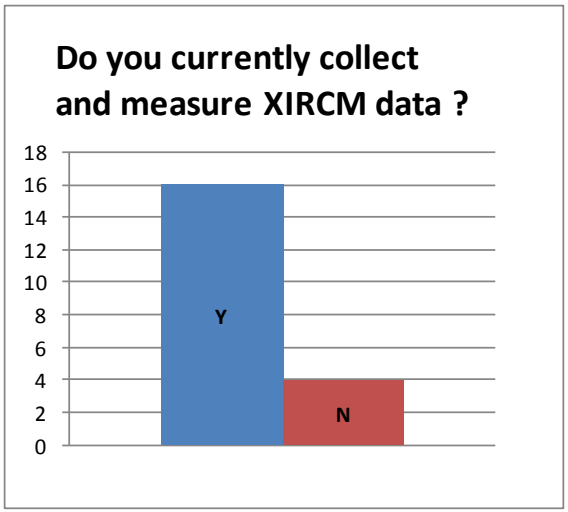
Response Metrics: All Stakeholders (1)

- A total of 27 industry organisation were consulted including Network rail, TOCs/FOCs/ ATOC, Train manufacturer, RCM suppliers, ROSCOs and RIA
- Response were received from 21 organisations (through 25 interviews) providing a good representative sample.
- '*Train monitoring train*' is the quadrant most stakeholders are involved in whereas '*Infrastructure monitoring Infrastructure*' involves primarily NR with some supporting activity from other industry partners.

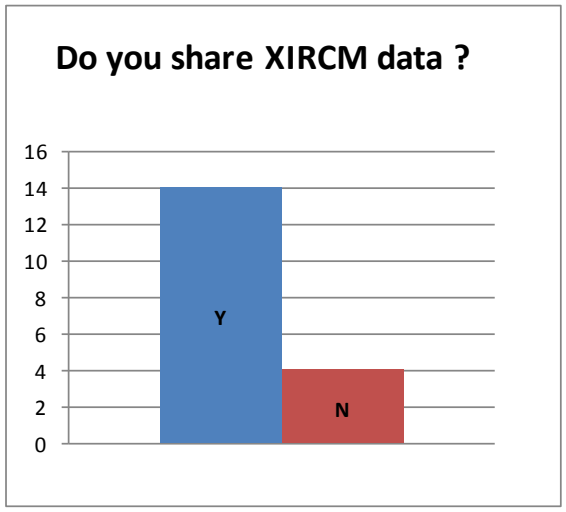




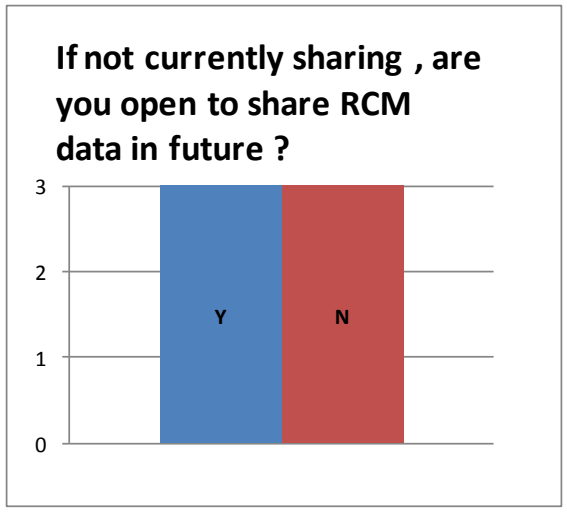
Response Metrics: All Stakeholders (2)



- Most of the stakeholders (16/20) collect and measure cross industry RCM which can be used by others.

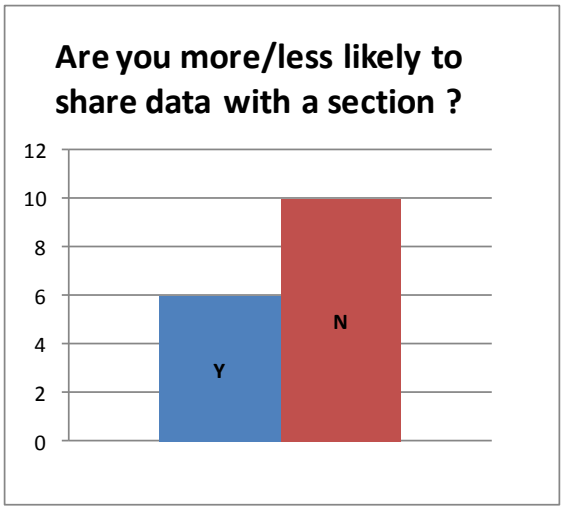


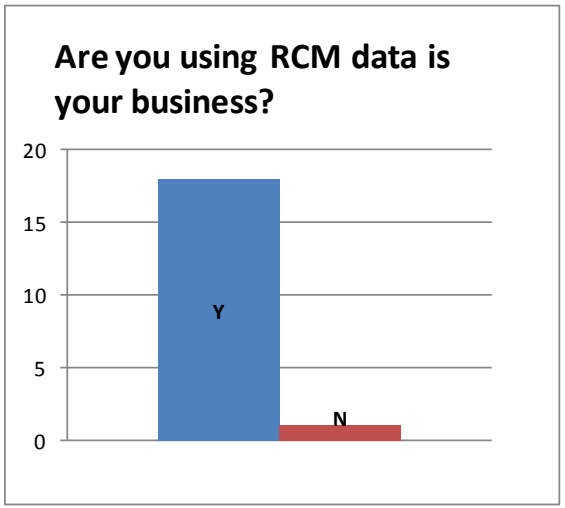
- Most of the stakeholders (14/18) share the collected data for cross industry RCM.

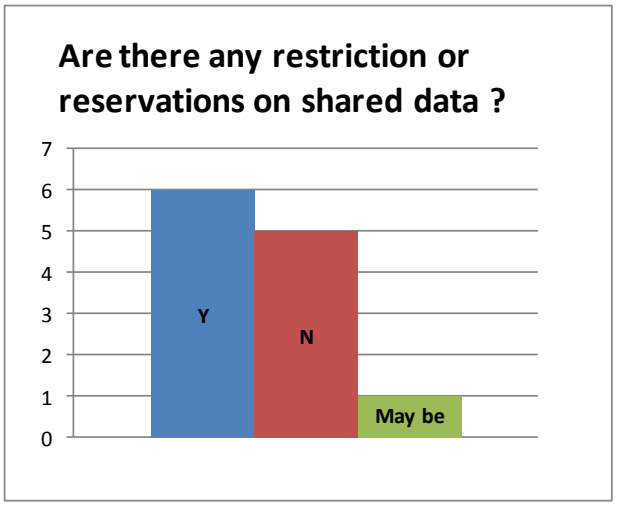


- Only a small number of stakeholders are not currently sharing RCM data but half of them are still edgy about sharing data in future as well

Response Metrics: All Stakeholders (3)

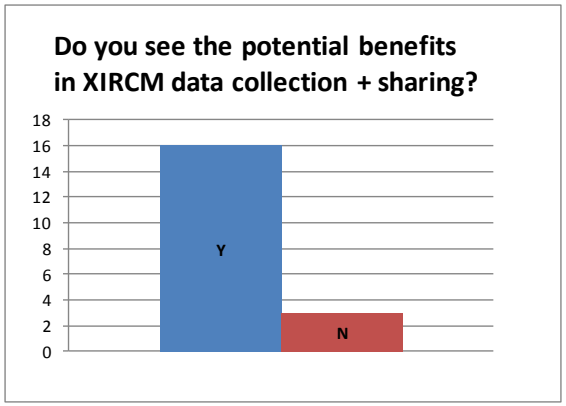


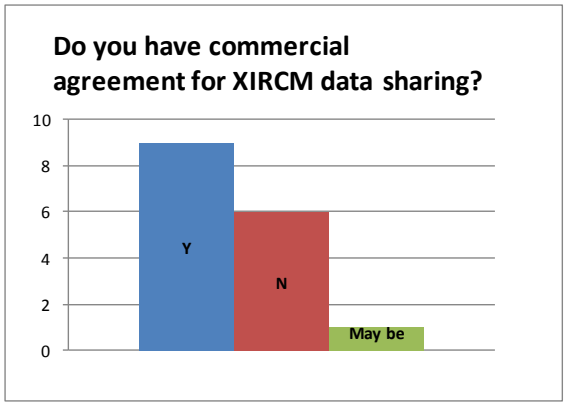


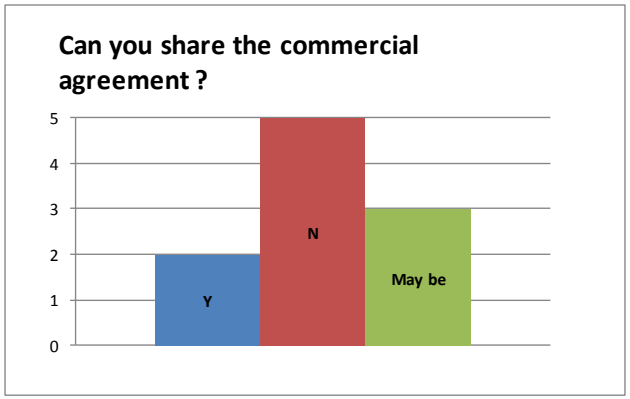


- Majority of the stakeholders (10/16) are willing to share their data across the industry with no preference to only certain industry sections
- Almost all the stakeholders (18/19) are using RCM data in their business (only exception is a RCM instrument manufacturer)
- More than 50% of stakeholders think that there are reservations or restrictions on the shared data provided by other parties

Response Metrics: All Stakeholders (4)





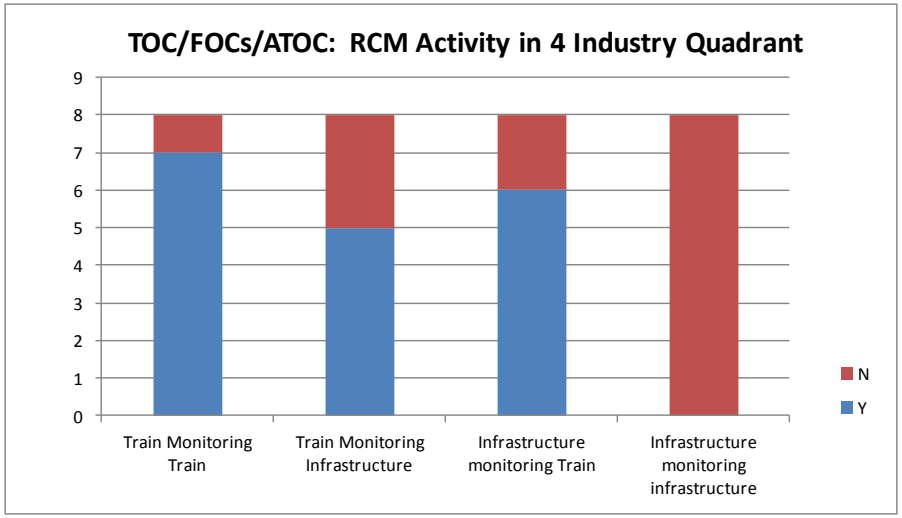


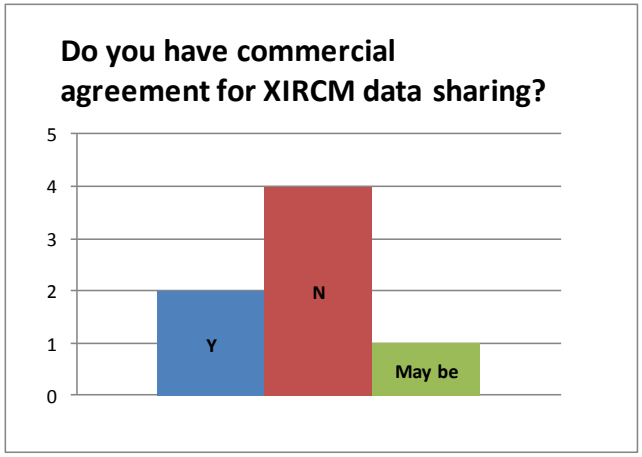
- Majority of the stakeholders (16/19) are positive about potential benefits of XIRCM data collection and sharing
- More than 50% of the stakeholders (9/17) have some commercial agreements in place for XIRCM data sharing.
- For the purposes of this study we have received three anonymised sample agreements from Network Rail and one offer to share an agreement from a TOC

FINDINGS: TOCs, FOCs & ATOC

Response Metrics: TOCs, FOCs & ATOC

- *7 out of 8 in this category who responded are involved in 'Train monitoring Train'* activities
- *6 out of 8 are involved in 'Infrastructure monitoring Train' and 5* out of 8 in *'Train monitoring Infrastructure'*





- Despite most TOCs & FOCs being involved in XIRCM activities, formal agreements for data sharing were not commonly reported
- Older initiatives are covered by existing industry agreements or regulations
- Some newer initiatives are still at a relatively early stage of development

Response Narrative: TOCs, FOCs & ATOC (1/3)

Level of interest in sharing RCM data cross-industry

- A wide range of responses, varying from
  - FOCs and Regional TOCs with great difficulty in making business cases or obtaining funding for XIRCM due to operating low intensity services - and therefore little involved, although some nevertheless expressing strong interest in the opportunities; to
  - Several highly committed and heavily involved London Commuter and Intercity TOCs well able to make business cases and obtain funding for XIRCM given the high intensity of their operations

Aspirations and needs for RCM information

- Significant interest in using XIRCM for performance improvement, infrastructure (track and OLE) and train reliability growth, train maintenance cost reduction, capacity management, safety and security, post incident investigation, etc.
- Some TOCs are working to get their entire fleets fitted with the necessary ethernet spine and antennae so that multiple initiatives can then be added
- For many TOCs/FOCs AVI is a critical ingredient to making XIRCM data from NR worthwhile

Response Narrative: TOCs, FOCs & ATOC (2/3)

Perceived issues and barriers to wider RCM adoption

- Getting costs low enough to provide a business case for funding
- NR tendency to over-specify, promote top-down solutions, and only use large and costly suppliers
- Complexity of industry, multiplicity of systems, distrust between NR and TOCs – will they try to use data in delay attribution disputes?
- Lack of open access to data and asymmetry with NR benefitting more
- Lack of recognition that TOCs generally will need agreement of ROSCOs and TSPs/maintainers

Potential solutions to overcome barriers

- Clarity on what data is shared, with whom it is shared, how the data will be used and who can see it
- Funding support from NR to demonstration projects /real life systems
- Distinguish between development initiatives and operational projects
- Cost effective bottom-up initiatives with small and medium level suppliers who have customised, well suited solutions
- Adopt national strategy such as on ETCS
- New RS should have a common list of mandatory RCM channels

Response Narrative: TOCs, FOCs & ATOC (3/3)

Existing commercial arrangements

- Many industry relationships are already contractual - through franchise agreements, track access agreements, rolling stock lease agreements, alliance agreements, etc.
- At the development stage there are often joint funding agreements for capital works but sometimes work is done without formalities other than the industry agreements referred to above
- Less often there are also agreements covering operation, maintenance and data sharing – agreements that this study is intent on addressing

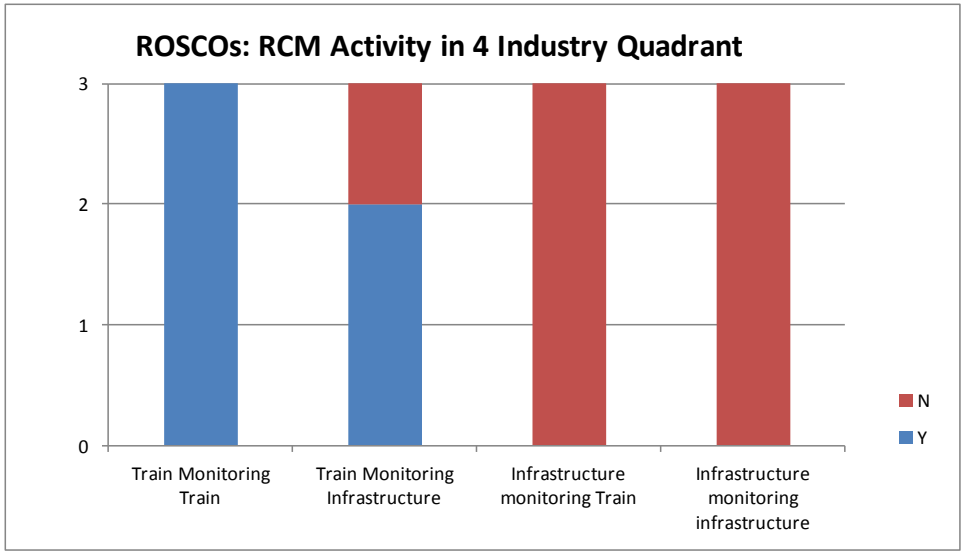
Specific commercial protections sought

- What data is shared, with whom it is shared, how the data will be used, who can see the data (non disclosure, restrictions on use), ready availability of data, data quality, integrity and security including Service Level Agreements
- Clarity on responsibility for renewal, maintenance and operation of kit, for data ownership, who is pays for data,
- Time for rectification of relevant faults
- End of franchise handover terms to be agreed with DfT; refranchising 'purdah'
- Common formats/interfaces and open source for business continuity planning

FINDINGS: ROSCOs

Response Metrics: ROSCOs

- All three ROSCOs are involved in RCM in connection their trains (*'Trains monitoring Trains'*)
- Two of the three ROSCOs are also involved in their rolling stock being used to monitor the infrastructure (*'Trains monitoring Infrastructure'*)
- No ROSCOs reported involvement in *'Infrastructure monitoring Trains'* although the TOCs to which they lease their rolling stock clearly are
- Presumably this is because they do not have to authorise modifications to their trains in this case



- Moreover, the ROSCOs are at one remove from the infrastructure provider, Network Rail

Response Narrative: ROSCOs (1/2)

Level of interest in sharing RCM data cross-industry

- Given that the ROSCOs' primary relationships are contractual ones with the TOCs and the train manufacturers rather than the rest of the industry, the interest in XIRCM (going beyond those parties to the wider industry) is not generally strong

Aspirations and needs for RCM information

- ROSCOs are highly interested in RCM with respect to improving their fleets' attractiveness to the industry – in particular reliability improvement

Response Narrative: ROSCOs (2/2)

Perceived issues and barriers to wider RCM adoption

- The value placed on "data" is inappropriate; only processed data ("information") upon which action can be taken is of value
- Identifying the right data, reliability of the data and access to data (current systems working in isolation)
- Competition between TOCs at franchise re-letting means that they are wary of sharing information on what underlies their performance
- Risk of issues with Competition Commission if seen as acting cooperatively with other ROSCOs

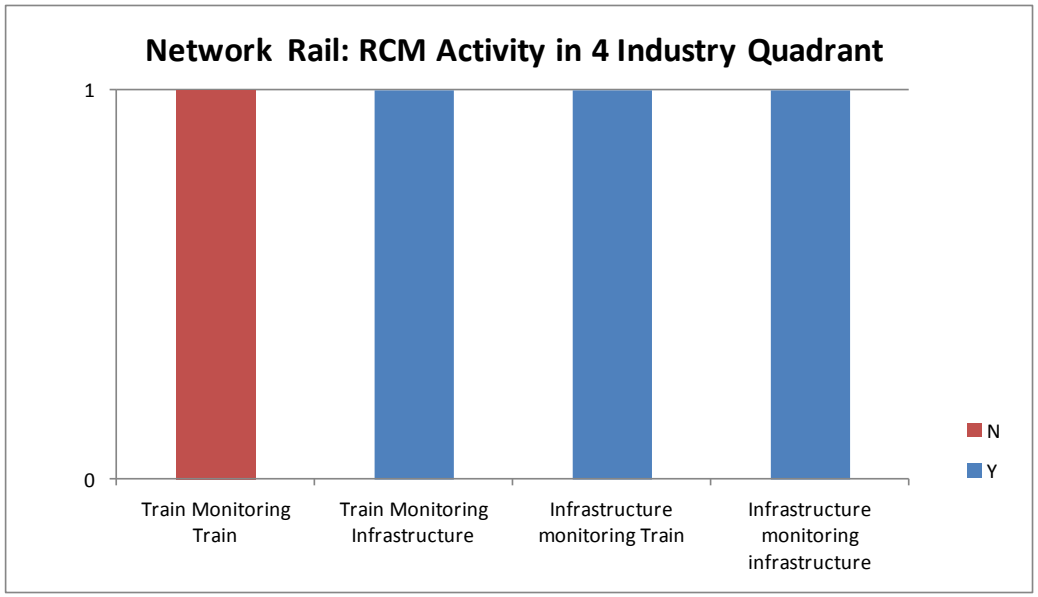
Potential solutions to overcome barriers

- Ensuring that industry agreements such as TAAs include definitions of "data" and "information" so that data is unrestricted and IPR only applies in the value added by the post processing of data that leads to the distillation of actionable information
- Suitable partnership agreements/ commercial agreements /non-disclosure agreements – there are already some commercial agreements in place for the sharing of data amongst cross-industry fleet-specific user groups

FINDINGS: INFRASTRUCTURE PROVIDERS (NETWORK RAIL)

Response Metrics: Network Rail

- Network Rail reported involvement in all parts of the RCM quadrant relating to infrastructure
- As might be expected it reported no activity in *'Train monitoring Train'*



Response Narrative: Network Rail (1/3)

Level of interest in sharing RCM data cross-industry

- A keen interest has been apparent amongst those involved in RCM at Network Rail
- The study team have not canvassed senior management in the Routes who play an important role in determining relationships with the rest of the industry; this might warrant some additional input

Aspirations and needs for RCM information

- Data that can be used for reliability growth, safety, maintenance and long term asset management
- Despite some concerns re. shared data becoming the 'Railway Evening Standard', Network Rail representatives were happy for data to be shared across the industry to promote the above , subject to caveats around sensitive data (e.g. CCTV streaming which needs careful control)
- There is no intention to make commercial gain from involvement in XIRCM

Response Narrative: Network Rail (2/3)

Perceived issues and barriers to wider RCM adoption

- Technology and its use, bespoke v. generic, sourced within rail v. elsewhere, train side v. infrastructure side - little commonality or spread
- Lots of consultants doing it their way
- NR desire for pan-industry RCM v. those who don't want to wait for that
- Time to market/ time to application - industry process are convoluted/ slow
- Business cases not being cross-industry
- Who pays and who gets benefits?
- Maintenance and upkeep of kit once installed

Potential solutions to overcome barriers

- Data can be divided into (1) raw data which can be shared easily and (2) analysed data which can be part shared with the industry and part kept to own use
- At 3rd level can we bring in automated tools for decision making in due course (used in military and air industry)?
- Better to have kit maintenance and upkeep as a part of franchise /TA/ TS agreements
- Open standards which can be used by all
- Getting a business case for a whole industry

Response Narrative: Network Rail (3/3)

Existing commercial arrangements

- Network Rail reports that they have a number of agreements in place such as for the first Railbam installation (all such installations will have similar agreements)
- These are generally funding and commercial agreements involving the supplier, Network Rail and the TOC
- Network Rail has shared a number of example agreements (redacted/ anonymised) with the study team so we can see what terms have been accepted by the industry in recent initiatives

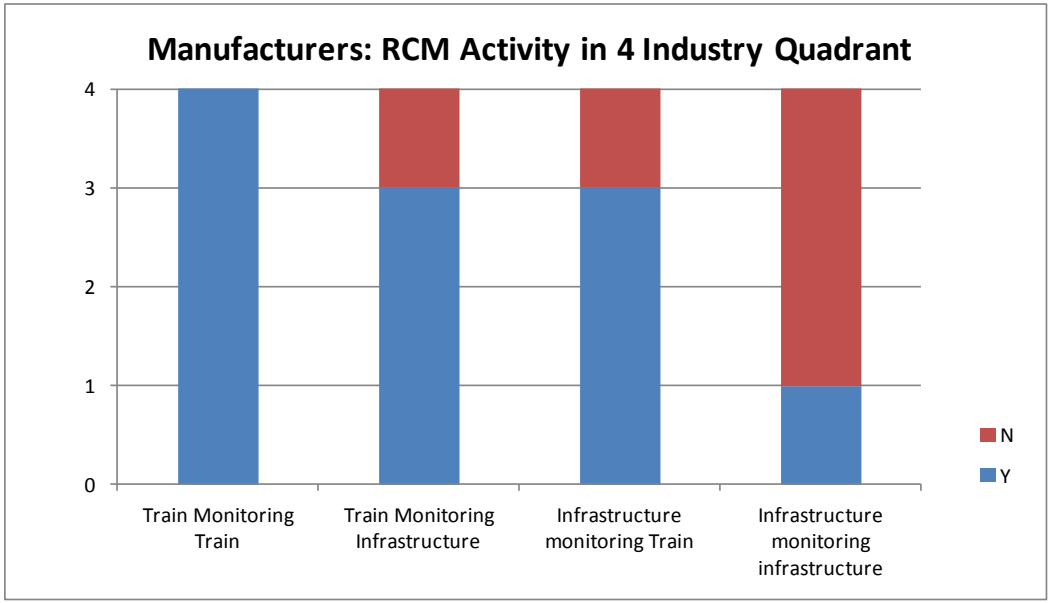
Specific commercial protections sought

- Key topics representatives of Network Rail referred to included:
  - 'Service Level Agreement'
  - What data and what format?
  - Level of accuracy
  - Frequency of data (daily, weekly…?)
  - How to decommission during works (allowing in SLA for out of service)
  - Name and contacts
  - Time to turn around / data processing
  - Communications and reliability for data transfer (& backup method if main communication method fails).
  - Consistent with industry contractual and regulatory environment, TAAs, FAs, etc.

FINDINGS – TRAIN MANUFACTURERS & MAINTAINERS

Response Metrics: Manufacturers

- Firms from this category reported involvement in all parts of the RCM quadrant
- *'Train monitoring Train'* is the strongest area with the involvement of all firms which responded to the consultation
- Three out of four respondents were involved in *'Train monitoring Infrastructure'* and *'Infrastructure monitoring Train'*
- One firm from this category also reported involvement with *'Infrastructure monitoring Infrastructure'*



Response Narrative: Manufacturers (1/2)

Level of interest in sharing RCM data cross-industry

- This category of respondent has been slowest to respond, possibly because of their size and commercial sensitivities
- Understandably in the competitive train supply market it's safe to say all actions taken in this category on RCM are driven by commercial advantage; not all respondents saw XIRCM as beneficial
- The study team noted the same commercial driver motivated all categories (except Network Rail) but tempered elsewhere by reference to "the right industry thing to do"

Aspirations and needs for RCM information

- Manufacturers are highly active in the field of *'Train monitoring Train'* typically with a view to:
  - Reducing the whole life asset management (WLAM) costs
  - Maintenance optimisation – pushing out frequencies and interventions
  - Automatic advisory generation
  - Validation, mitigation and management decision taking
- Most manufacturers are also responsive to commercial opportunities in monitoring train/ infrastructure interaction

Response Narrative: Manufacturers (2/2)

Perceived issues and barriers to wider RCM adoption

- Commercial sensitivity deterring involvement
- Benefit residing with parties other than the value generator
- Cost based approach killing value generation
- IP issues
- Lack of understanding in the industry of:
  - How to partner successfully, stifling innovation and leading to above issues
  - What Condition Based Maintenance (CBM) means and how it can be informed by condition monitoring, whether remote or not

Potential solutions to overcome barriers

- Industry needs to evolve and recognise value and partnership
- Industry needs to learn CBM and WLAM

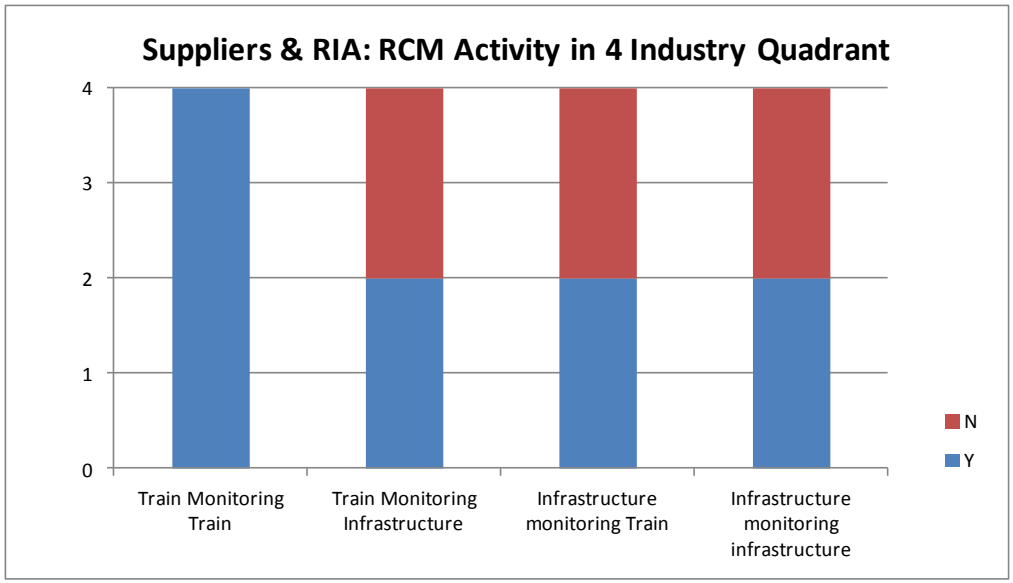
Commercial arrangements

- Commercial arrangements are already in place with ROSCOs and TOCs in terms of asset purchase, support and maintenance and these include use of RCM for the collection of data on their trains
- Key issues are IP, confidentiality and limits of use of data which is shared with ROSCOs and TOCs

FINDINGS – RCM SUPPLIERS

Response Metrics: RCM Suppliers

- One of the five responses in this category was from the Railway Industry Association (RIA) which assisted us with relevant contacts in RCM industry contributors
- Of the four suppliers who have (so far) responded, only two reported involvement in all parts of the RCM quadrant
- *'Train monitoring Train'* is the strongest area with the involvement of all firms which responded to the consultation



Response Narrative: RCM Suppliers

Perceived issues and barriers to wider RCM adoption

- Confidentiality of data
- Lack of understanding by Network Rail of motivations of supply base
- IPR issues including retaining IPR on innovations
- Business cost/gain split
- Cultural challenges to making use of the data/information derived

Existing commercial arrangements

- Suppliers have commercial agreements for the supply of equipment, software and services including data collection, analysis and hosting, and the distribution of processed information to clients in accordance with their requirements
- Key features of agreements include:
  - Ownership retained by client
  - Security of data
  - Refresh rates
  - Accuracy and validation

OBSERVATIONS AND NEXT STEPS

Observations (1/3)

- The principal parties in XIRCM are TOCs and Network Rail Routes (backed by HQ) operating where capacity is at its limits and poor performance has major consequences
- The most successful initiatives are developed from the grass roots up working with the RCM supply chain (and ROSCOs and manufacturers)
- This leads to innovation and diverse systems, delivers real benefits and - for TOCs - competitive differentiation (i.e. the McNulty agenda live and well in the industry)
- It also leads to lack of commonality or spread of best practice - against the grain of Network Rail's instincts
- However, top down systems have not proceeded to implementation (e.g. LiveTrain) and can risk running counter to the McNulty agenda

Observations (2/3)

- Mandating use of particular systems across industry is therefore likely to be counterproductive
  - This is very different from moving over time towards commonality of system architecture without stalling current initiative
  - This is also despite RCM industry suppliers being frustrated by the benefits of their systems not being fully recognised or exploited even where they are installed
- Template commercial agreements need to 'enable' the technical, whatever it is, not dictate to it
- Templates need to avoid the trap of allowing IPR to rest in 'data' rather than in its processing into value added 'information'
- Templates need to embrace uncertainty and experimentation with data to find significant information, be brave over data quality and waive SLAs at the development stage

Observations (3/3)

- An 'Agreement Lite' or Memorandum of Understanding may be appropriate when parties come together for the development phase of initiatives
  - The extent to which each party will benefit may be unclear initially, but real costs will be incurred meanwhile
  - Having commercial principles for the implementation phase in place early on should encourage participation in the development phase
- This would be followed by a full agreement to cover investment, ongoing operation and maintenance costs and SLAs (very possibly two-way, detailing who does what, the level of reliance, what happens when systems are degraded, etc.) along with governance arrangements and rules on 3rd party involvement, data sharing, IPR on value add information, etc.
- We are focusing our templates on deals between consenting parties (first step first) not the 'cloud of data' concept (a future ambition)

But let's not get ahead of ourselves...

- To complete Part 1 of our work we will analyse the feedback more fully to inform Part 2 of the study:
  - Derive business process mapping that will make clear the relationships that need to be contractualised and define the types of parties to be involved
  - Derive recommendations to address the issues and barriers identified
- Part 2 starts with two data sharing case studies that will take our understanding to a more detailed level and assist in developing the commercial principles that will form the basis for the agreement templates

Case Studies

- We agreed with the Steering Group that Case Study 1 should be 'acoustic axle bearing monitoring (Railbam/ TADs)' an example of 'Infrastructure monitoring Train'
- For Case Study 2 we suggest UOMS OHLE monitoring – 'Train monitoring Infrastructure' at the pan/catenary interface
- We will need the co-operation and support of all the parties involved in a particular application of each technology

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