SCADA - Frequently Asked Questions

Update 1

This document will evolve over time as more questions are submitted. To submit your question, please email: SCADACommunications@networkrail.co.uk

Please click the links below to navigate the FAQs.

Programme Delivery

Delivery

Q. Why is the introduction of the new system so far behind schedule?

A. The SCADA Programme has previously been in a difficult position in terms of both delivery and stakeholder confidence and has encountered a range of problems.

The programme has had a number of sponsorship changes; the most recent to STE in July 2016. At this time the programme was in delay by around two years. A proposal revising the delivery approach, governance and work-breakdown structure was presented and endorsed by Executive Committee (ExCom) in October 2016. Robust governance has now been put in place with a stable work-breakdown structure of 8 work packages and the programme is now gaining confidence of key stakeholders and end-users. The legacy systems have all been declared obsolete and have caused significant performance issues for the Routes when they fail. Strategic spares are no longer available and, therefore the risk of deferring the project further cannot be tolerated.

Q. What are the overall confidence levels in delivering to the revised schedule?

A. In October 2016 the SCADA Programme changed its delivery approach with STE taking up project integration. The project made significant progress in December with HMI for a.c. (software version 2) being agreed, as well as the functionality required by the Routes for each software version release.

Our Subject Matter Experts have been better engaged and have helped to develop the system with telent.

The project went to E-SRP (the panel that review the system safety case and approve the system for use on the network) in April and gained approval.

The new system is in use in Didcot. The system is controlling the traincare depot at Reading and the test track on Western Route which is giving us useful data.

We also have a system support team that manage any faults in the system giving us confidence that you will have the appropriate ongoing support to manage day to day issues, like new user requests and forgotten passwords, as well as respond quickly to anything more serious should it arise.

We meet with the Electrical Control Operators Joint Working Group who are kept fully appraised of progress on the Programme and are complimentary of what they have seen of the system.

The progress made, as well as the feedback from SMEs, Joint Working Group, and Route colleagues is giving the company greater confidence in the Programme. Feedback includes from a Electrical Control Operators Joint Working Group meeting at telent, a positive update on the SCADA system was given to the National Operations Council on 29th March 2017: “Feedback provided by the SMEs has been listened to. We have confidence that the development is moving in the right direction and can see it now as more of an evolution of current systems, rather than radical change.”

This has been reflected in South East Route where they have seen a "significant increase in the positive attitudes displayed by ECO’s across the South East Route, and believe the improvements reported from the SME’s regarding the project and system updates has helped our ECO’s regain a lot of trust in the system delivery”. As well as confidence from the Business where the SCADA Programme's transition of Sponsorship to STE has been endorsed at ExCom and Re-Authority approved by Group Investment Panel.

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Q. What are the key steps to entry into service for the new system?

A. The project will follow the Network Rail standard for Entry into Service (EIS), the design will follow the following steps for implementation:

1) Area design phase, leading to approved design Form B endorsement
2) Area safety case, produces hazard analysis to ensure no core hazard mitigations are broken
3) Area configuration by supplier
4) Area configuration acceptance test
5) Area Site Over and Back Testing
6) Route training and competency in parallel to above activities
7) Area Over and Gone, leading to EIS
8) Post commissioning support

Q. When will the system be ready to demonstrate for a.c. and d.c.?

A. Both a.c. and d.c. have been developed with the ECO Subject Matter Experts.

The a.c. version (version 2) required to commence national roll-out is currently available and has been demonstrated to Network Rail. This has allowed us to install the system in Romford and complete on-site testing in July 2017.

d.c. is in final development. Once this has been completed, we aim to share screen captures from September.

Q. When will a d.c. system be available?

A. d.c. functionality is part of Version 3 software release and is due this Autumn.

Q. How is development of the screens progressing and what is their acceptance status?

A. a.c. screen principles have been developed and assured through the core system acceptance process. Version 2 is available for release now (a.c.). Version 3 (d.c.) will follow in the Autumn.

Each area's "on screen" layout will be then subject to a further Configuration Acceptance Test (CAT) test prior to implementation. Area design prior to the CAT test will provide an opportunity to the local area teams to comment on draft "on screen" layouts. It should be noted that the core HMI symbols are fixed by the approved HMI design set.

Q. Why did you choose telent?

A. telent were awarded the contract after a standard Network Rail tender evaluation process.

Q. Will you be replacing the existing comms lines?

A. For Electronic sites no, this is not within the project scope in terms of replacement of the existing communications to the RTU's.

Fibre links have been preinstalled to allow an IP based communications system to assist in the migration of the remaining Electromechanical systems being replaced with RTU's.

Roll out prioritisation

Q. How will re-prioritisation of each route be undertaken? Will this involve feedback from each route (inclusive of emerging or present risks)?

A. The SCADA team has recently undertaken a reprioritisation activity to understand the current issues for each Route in relation to SCADA.

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This includes existing systems reliability, resourcing needs (for example retirement of critical staff for eletromechanical ECRs) and infrastructure projects that require the new system in order to enter into service (eg. Anglia with Crossrail, and Cathcart with EGIP). This has involved meeting with reps from each Route including ECROMs, RAMs, Route change and sponsor teams. There is further work required (with discussions ongoing) with other infrastructure programmes, the Wessex and Southern Routes to finalise the implementation sequence and align the RTU installation work.

Q. When will the system be implemented in my Route/ECR/ROC?

A. Plans for implementation vary in detail for each Route and we are still meeting with Route colleagues to firm up dates. Each Route is being engaged with and detailed plans are developing. Anglia is our next Route for implementation and is due to go-live by the end of the year. Plans for each Route will be available through your ECROM or Route Sponsor and we will keep you informed as the plans develop.

Q. Will you be trialling the new TPCMS at a smaller location such as Sandhills prior to installing at other ECRs?

A. No. The sequence has been agreed at Sponsor level to balance urgency and also availability of functionality i.e. a.c. then d.c.
Please note: Version 1 of the TPCMS software has been in-service for circa nine months on Western Route.

Q. Will TPCMS be installed at the ECR before the ROC?

A. Yes. This is the process that is being followed to make the testing and commissioning as smooth as possible and limit the impact to operations and personnel.

Following the Stage 1 commissioning at the ECR, and some enabling voice works, the Stage 2 Migration to the relevant ROC (if applicable) can then follow straight on, if and when required by the Route.

Key Risks

Q. What are the key programme risks?

A. There is significant business change associated with the implementation of the new system and the development of new software functionality. For instance, some Routes plan to move our colleagues' place of work as a result of having the national system, which always imports additional risk to the day to day running of the railway. We are working closely with the ECO Joint Working Group, Route Change Management Offices and presenting to each Route's System Review Panel to minimise this risk. We have also stepped up our communications to be as clear as we can about what is happening and when. For some Routes, the plans for implementation are still being developed because they are towards the back of the programme, so we may not be able to answer everyone's questions just yet, but we are working with all Routes to develop detailed plans over the coming months in line with our timeline.

The delivery of a complex system across the national infrastructure is also challenging. ECRs currently work in slightly different ways using 15 different (and life-expired) SCADA systems, so implementation of a national system into devolved Routes, that are further devolving, requires careful planning. The programme is addressing this through its revised, integrated approach led by an STE Programme Management team. This means that the IP team is supported by 7 other 'work packages' designed to give consistency across the business; prolong the life of the existing systems; provide new telephony/communications (through FTNx); and support Route engagement and business change.

Funding

Q. Is the project fully funded and authorised to deliver its scope?
A. Yes. The project has successfully been re-authorised to deliver the full scope of works.

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Testing

Q. When will the Route be advised of the level of Involvement of ECOs and RAMs in designing and agreeing the TPCMS configuration?

A. The framework of the SCADA system at version 2 has been completed, i.e. principles of the system design. Each independent area will be configured to these design principles for a.c. and d.c. RAMs and ECR representatives will be invited to comment on the area layout diagrams to ensure each local area is represented correctly.

Q. What is the proposed level of Input/Output (I/O) testing and plan?

A. For existing RTU sites, during Over and Back Testing, the target is to test 100% of all control Points, e.g. Circuit Breakers, MOS's, Dummy Circuit Breakers & Modem control etc. Closeout agreement shall be reached with the Asset Manager (in conjunction with the ECROM/ECOs) for any items that cannot be tested due to operational restrictions that cannot be overcome, or by equipment faults. For all Control Items, the status shall be correlated against the legacy SCADA system where this is technically possible.

For the testing of Digital Inputs, for all sites, the Digital Input status will be fully correlated against the legacy SCADA system where this is technically possible.

Additionally, 30% of sites will be tested by attendance to provide additional assurance and again, where technically possible, the Digital input status shall be simulated to test the Digital Alarms.

Please note that for electronic sites, generally no field wiring modifications are required. At Electromechanical sites where new RTUs are being installed, a 100% traditional site based testing regime will take place.

Each area will receive a dedicated test plan followed by briefing prior to I/O testing taking place to ensure the testing plan is fully understood.

Business Benefits

Q. What wider benefit does FTNx bring to the business once installed by the SCADA Programme?

A. The legacy FTN network is old and equipment is becoming harder to source. There are many locations across the UK where the network is already running close to capacity. Only FTNx provides the requested network resilience and availability required by SCADA. Some of the advantages FTNx can bring are:

1) It is a high capacity, high speed, high bandwidth, highly available network.
2) Centralised security management helps prevention of cyber-crime.
3) Centralised system management to proactively detect, rectify faults and failures. The network is designed with a high level of redundancy and intelligent service routing.
4) It is based on a platform that is used by commercial Telco's, ensuring a support and development from vendors for the foreseeable future.

TPCMS System

Display

Q. Why does the TPCMS System have grey screens?

A. The choice of background colour for TPCMS was proposed by the manufacturer, but was accepted as it is based on sound ergonomic principles.

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Bright colours that are necessary on a black background create extreme brightness contrasts and have been shown to affect visual performance. A brighter overall display, as is provided with a grey background, closes the iris in the eyes, increasing the depth of visual field. This means the eyes will need to adapt less to focus over a wider range of viewing distances.

Use of a mid-tone grey background allows use of both dark and light colours for background detail. This gives more option for adding content without the displays seeming cluttered. It should be noted that in developing the current symbol set, care was taken to retain colours and symbols for critical information, such as breaker status, that are clear and easy to read.

A dark screen background is also more susceptible to glare from windows and lighting, so it becomes necessary to work under reduced lighting levels. A light or mid-tone background can be used in a brighter control room environment, which is better for reading documentation, for completing paperwork and for maintaining alertness and performance.

This is not just a change being made to SCADA systems. The Thales Traffic Management System has adopted a grey background display for the same reasons.

Q. Are we avoiding cluttering the screens with information that is not controlled by SCADA but which will present a configuration challenge when it changes?

A. Yes. December 2016 concluded a series of workshops to prevent any unnecessary screen clutter and information that is not required, yet allows the SCADA system to remain within the E&P policy requirements.

TPCMS System Functionality

Q. Will the new TPCMS have, at a minimum, the same functionality as that of the existing system?

A. Yes. The new system will include all the existing functionality of the existing systems as well as a lot more.

The original version 1 release was constrained to meet the timescale for the commissioning of the 3 initial Western substations. The version 2 a.c. release and version 3 d.c. release planned for Autumn 2017 will include all agreed functionality for the operation of the system. Version 4 is the final update available at the end of the year. Features of the new system include:

- The new system will display traction power system energisation / earthed / shorted status
- Improved analogue depiction with trending
- Distance to fault facility
- Switching schedules
- Plant Capability
- Reporting functionality
- Training and Study modes

Q. Will we continue to use U shaped Bus Bars? My concern is that it may not necessarily suit a d.c. system?

A. Detail for the d.c. system screens has now largely been agreed with the user group. The principle of 'U' shaped bus bars has been adopted, however this is subject to test and validation.

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Q. Will the project install a new phone system?

A. Yes, the project is providing a new phone system called Turret Telephones on migration from the ECR to the ROC.

Q. What alarms will I get back I get back in the Electromechanical areas?

A. The project scope is for a like for like replacement of the existing Input/Output. However, this provides the option/capacity of additional alarms should these be required.

Q. The idea was to have a national standard platform. What happens if it becomes evident that a one size fits all isn't achievable?

A. The Platform Manager (Nigel Edwards) will make the necessary decisions for this National System. We have already adopted a pragmatic approach in a number of areas for example to the application of non-telemetered devices in DC areas. Please note: the development will continue in consultation with the designated SMEs.

Governance

Q. How are you assuring that the new system is fit for purpose and safe to use?

A. The core platform is subjected to testing and goes through a series of factory testing, user testing and site testing prior to being declared ready to use. This has also been subject to National ESRP approval and independent validation by an independent safety assessor.

After this, each area configuration (i.e. Anglia, Cathcart etc) including screens, will be subject to further implementation then configuration acceptance tests in the factory, and site testing to confirm the area layout is correct and can be implemented.

ROC Environment

Q. TPCMS System - What desks are we getting?

A. The desks have been designed in line with relevant ergonomic standards and operator task requirements. Representatives on the Electrical Control Joint Working Group are kept informed on development of the desk design. The current status of desk design was discussed at the working group meeting July 2017 and further updates will be provided.

Telecoms

Q. Will SCADA be deployed over FTNx as envisaged?

A. Yes, where available and subject to Network Rail Telecoms Safety Case approval. It can operate over FTN or FTNx.

Note: The system utilises standard IP technologies.

Q. Will there be a TPCMS 'familiarisation unit' positioned in the ECR to assist with the conversion training and underpinning knowledge?

A. Current project scope provides a familiarisation system available in the training centres at Three Bridges and Manchester. The option to have local training facilities is being discussed with all Routes.

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Route Migration

Staff relocation

Q. Can you confirm the ROC migration locations and when I will be moving?

A. We have been working with the Routes to determine timescales for migration which will be shared with representatives in the Electrical Control Joint Working Group. We have published a poster which will be displayed in each ECR and contains current information. For more information regarding ROC migration please contact your ECROM.

Q. What happens if I don't want to move to the ROC?

A. ROC migration will take place after formal Route consultation. If you have concerns regarding relocating to the ROC, please speak to your ECROM. Please refer to the latest TPCMS Poster for the latest migration timings.

ROC Environment

Q. I am concerned that the environment in the ROC will be too noisy to work safely from. What steps will be taken to tackle this?

A. This will be agreed locally with your Route Representative. If you have concerns about the environment in the ROC please contact your ECROM.

System Familiarisation

Q. Will there be a TPCMS 'familiarisation unit' positioned in the ECR to assist with the conversion training and underpinning knowledge?

A. Current project scope provides a familiarisation system available in the training centres at Three Bridges and Manchester. This is currently in discussion with each route and the sponsor team.

Q. Can I come and see the TPCMS system

A. If you would like to come and visit the system please arrange this through your ECROM. Please note that due to ongoing development work, spaces will be limited.

Who to contact

Q. As an ECO, if I have a question about how I am impacted by the new system or about relocation, who do I ask?

A. Please address you question to your ECROM in the first instance.

Q. I'm an ECO 1, what happens to me when the new system comes in?

A. Each route is determining its strategy for SCADA deployment within a national framework. Your Route will provide more information when it becomes available.

Training

Locations

Q. Where will ECO TPCMS training be undertaken?

A. The project's remit is for training to be undertaken at Three Bridges and Manchester ROCs. However, we appreciate that more localised training is often the preferred option for Route businesses.

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Some Routes are reviewing options to support more localised training and the Project is working with each Route to deliver the right solution.

Q. What happens if I don't want to go to Manchester/Three Bridges to get trained?

A. Current project scope provides a familiarisation system available in the training centres at Three Bridges and Manchester. This is currently in discussion with each Route and the sponsor team.

Dates

Q. When will the Route be advised of Training dates?

A. Training dates will be agreed with Routes once a date has been agreed with them for Entry into Service.

Duration

Q. How long is the TPCMS conversion training course?

A. The current duration of the TPCMS a.c. Operations training course is 2.5 days and the final duration will be confirmed by CDG in September 2017. We are unable to provide a definitive TPCMS d.c. training course duration at this time. However a working assumption is 5 days for planning purposes.

These training materials are due to be submitted in September 2017, and following the completion of validation and assurance activities we will be able to confirm course duration. In terms of Maintenance training course duration this work is still under development. Timescales will be communicated as soon as possible after we have confirmation of the Operating Model for Maintenance activities.

If you have any other questions, please email: SCADACommunications@networkrail.co.uk

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Further Details

SCADA Work Package Table

SCADA Work Package Accountabilities

SCADA Work Packages			
#	Work Packages	Work Package Lead	Accountabilities
1	BBD020	Simon Bretherton	Accountable for core delivery of the programme
2	BBD020 Technical Authority Support & Platform Manager	Nigel Edwards	Accountable for ensuring Technical Authority Support is delivered in line with BBD020 requirements and ownership of the National SCADA Platform
3	Maintenance & Support (Incl GBS)	Tim Flower	Accountable for ensuring the new system is fit for purpose and adequately maintained across Routes following EIS (Entry Into Service)
4	Operations	Paul Ashton	Accountable for ensuring network continuity across the Routes both to enable EIS & ongoing operations
5	Network Rail Telecoms	Andrew Davies	Accountable for system maintenance post EIS
6	Legacy Support STE	Nigel Edwards	Accountable for ensuring network continuity across the Routes to enable ongoing operations of the current life expired SCADA system
7	Training & Competence	Richard Brown	Accountable for ensuring all relevant personnel are adequately trained and competent in time for EIS and for BAU
8	Industrial / Employee Relations	Mustafa Faruqi	Accountable for all Trade Union consultation and engagement on behalf of the SCADA Programme so ensure smooth EIS

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