Request for Information - Report

Modular Measurement Train

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Content

1 Introduction

This document describes the progress and results of the “RFI – Modular Measurement Train” by ProRail, reference TN 438939. The substantive principles are not repeated in this report, reference is made to the original RFI document. After this introduction, the most important insights are summarized based on the questions in the RFI. Responses are anonymized and confidential information shared is not included.

1.1 Process

This RFI started with the notice on TenderNed of the RFI Document on November 2023 (TN 438939). On December 13th, 2023 an Information Memorandum has been published. Until January 17th, 2024, market parties had the opportunity to submit their written answers to the questions posed in the RFI Document. Ultimately, ProRail received a substantive response from 19 parties. These parties indicated that they are interested in (part of) the scope.

After an analysis of the written answers, ProRail asked 7 parties clarification questions in a dialogue, as mentioned in paragraph 2.2 in the RFI. This report has been provided for factual verification to all parties who responded in the written round. The final report will be part of the tender documents, if ProRail decides to publish a European tender.

2 Questionnaire Part 1: Modular Measurement Train

2.1 Introduction

1A	Can you give a concise description of your organization and the services it offers?
19 Companies have responded to the questionnaire, but not all questions were completely answered by all respondents. All the respondents are in some way related to the field of track measurement and track inspection in the measurement domains mentioned in the RfI. None of the respondents is solely focussed on logistics and traction.	

1B	What is your opinion on the division of carrying out condition monitoring with measurement trains in the tenders as mentioned in Chapter 1.4 of the RfI document versus the current working method in which all components are outsourced to one contractor? Think, for example, of the operation as a whole. interaction, coordination, collaboration, preconditions. What opportunities and what risks do you see?
Based on a generalisation of the responses, the following opportunities and risks are mentioned as most important: Opportunities: - With the concept as mentioned in the RfI, ProRail can profit from direct contracts with several partners who are experienced and specialised in a small part of the total scope. - The investment for companies to be able to participate in the concept is lower than with the current type working method. - The separation of traction & logistics from the measurement hub and measurement systems makes it more accessible for a broader market. Risks: - Managing the interfaces between components, responsibilities and demarcation of the contracts will be difficult. - The addition of (contact) measurement system after initial operationalisation can influence the (dynamic) behaviour of the train and therefore the results of other measurement systems.	

- The concept as mentioned in the RfI doesn't distinguish between the hardware (train) and the software of the hub in tender 1. - We do not have gained a complete picture of the market for traction & logistics with this RfI.

1C	In order to promote a healthy market and to prevent ProRails dependence on one or a few parties to become too great, ProRail is considering imposing restrictions on the number of orders to be obtained. Do you prefer one or more tenders and in what order?
Based on a generalisation of the responses, most respondents prefer separate tenders as mentioned in the RfI. Some respondents prefer an integrated product (tender 1 + 2 + 3). A large part of the respondents is interested in acquiring a contract to supply one or more measurement systems (tender 2), possibly combined with providing the measurement hub. Some respondents are mainly interested in tender 4 (consultancy and auditing). None of the respondents is solely interested in tender 3 (traction and logistics)	

2.2 Experience with modular measurement hub

2A	Can you give an indication of the maximum lifespan of a modular measurement hub? Which factors are important?
Based on a generalisation of the responses, an average lifespan for the rolling stock of at least 20 years is mentioned. For the (measurement) systems an average lifespan of about 10-15 years should be taken into account.	

2B	What is a realistic lead time for realizing a ready-to-measure measurement hub? Please elaborate.
The responses vary. A minimum of 12 months after final design approval is mentioned if a standard existing solution is chosen, but also several years from start to operation is mentioned by some respondents if a new concept is needed to be designed. Some respondents distinguish in their answers between a first phase for the design and build of the platform and a sequential phase for certification.	

2C	Can you indicate your preference for the duration of the contract (in number of years) and what your considerations are?
On average, the preferred duration of the contract for the measurement hub is around 10 years with a 5-year minimum, but this is also depending on the form of the contract (see 2E) and the type of work that should be provided by the contractor for the measurement hub.	

2D	Can you give an indication of the number of measurement hubs required to measure an average annual tender (for all measurement domains together as included in Appendix 2)? What would be the impact of measuring at high or low speed for specific measurement parameters? Please elaborate.
A large part of the respondents hasn't provided a detailed answer, because they need more information about specifications, measurement needs and availability of track. The respondents who did provide an estimation, state it should be in the range of 2 to 10 hubs, depending on the intention of ProRail to combine measurement domains and the amount of redundancy that is needed. Several respondents added 1 hub as reserve. In general, the respondents state that several measurement parameters cannot be obtained on high speed, resulting is some impossible combinations of measurement domains.	

2E	ProRail will invest in measurement hubs but is open to ideas on the method of investment. Can you indicate your preference and what your considerations are? a. ProRail is the owner. b. Lease agreement c. Other.
Most of the respondents who can offer a measurement hub in some way, prefer ProRail ownership for the hardware. Other options mentioned by some were a lease or a "Data as a Service" agreement.	

2F	Can you give an indication of the costs of purchasing and maintaining a measurement hub? What are your principles and boundary conditions?
The provided answers on this question are considered confidential and only for use by ProRail.	

2G	Do you have any other comments you would like to make?
Several respondents have given additional practical suggestions or considerations for ProRail regarding the separation of measurement hub and measurement equipment.	

2.3 Experience with measurement equipment.

3A	What experience do you have with supplying and measuring with measurement systems on measurement trains and/or measurement carriages?
18 respondents have answered this question. The experience of the respondents is very broad. Some have only performed a (small) part of the measurement process, while others have experience in the whole process from designing a measurement system to analysing the data for the customer and delivering the data to the systems of the customer	

3B	What experience do you have with the processing and delivery of measurement data and information to infrastructure managers?
Most respondents have experience with the processing and the delivery of measurement data and information to their customer. This varies from raw data to full analysis reports.	

3C	ProRail is used to working with specific ICT systems, tools and processes, such as BBMS (monitoring system for relevant data/information), spoortakken 2.0 (reference system for segments) and MEET (formulating measurement needs and feeding back Planning, Realization, Output, Delivery, Acceptance). To what extent are you already familiar with the relevant systems? Can you connect to this? If so, what do you need for this?
Most of the respondents are already familiar with one or more of the ProRail systems and processes. About half of them already has some integration or connection to these systems. Most of the other respondents see no major issues to develop a connection to the ProRail systems if ProRail provides the technical specifications like data format.	

3D	For which measurement domains can you supply (modular) measurement systems for installation on the measurement hub and perform condition measurements? Please describe what you can measure, and the measurement method(s) used.
The provided answers on this question are considered confidential and only for use by ProRail	

3E	What is a realistic lead time for delivering and installing a measurement system on the measurement hub? Please elaborate.
Only some respondents have answered this question. Lead time for delivery and installation has a lot of dependencies of which the most mentioned are: - The mounting system on the measurement hub - The vehicle dynamics of the measurement hub - The validation requirements from ProRail - The needed certification for the system (and the combination with the hub) The average time given in the responses is about 1 to 1.5 year.	

3F	Can you indicate which contract duration (in number of years) you prefer and what your considerations are?
On average, the preferred duration of the contract for the measurement systems is around 5 years with a 3-year minimum, but this is also depending on the form of the contract and the type of work that should be provided by the contractor.	

3G	What is your opinion on dividing the tender measurement systems into a tender per measurement domain as mentioned in paragraph 1.4.2 of the RfI document?
Based on a generalisation of the responses, the following opinions can be distinguished regarding the separation per measurement domain: - It would be better to combine the tenders for all systems and the measurement hub. - ProRail can contract the best solution per domain. - Separation makes it possible to utilize the specific knowledge of different suppliers. - Separation requires also the integration to a common central (data) hub on the measurement platform, for example for the localisation reference (real-time or post-processing) - There is an overlap of systems / components per domain	

3H	It will not be ruled out that monitoring of the mentioned measurement domains will be clustered in one or more tenders. What possibilities and impossibilities do you see and why?
Based on a generalisation of the responses, the following possibilities and impossibilities are mentioned: Possibilities: - Minimising costs - Cross validation and combination of measurement data - Synergy between measurement systems and integrated solutions - Combine measurements that should be performed under similar conditions. Impossibilities: - Some specialized suppliers might not be able to participate on their own in a tender. - The risk for ProRail can be high if there is a dependency on 1 contractor for many measurement domains	

3I	Are you acquainted and/or do you have experience with system validation and admission by a track-manager such as ProRail or an independent third party? If your system is not validated for the Dutch regulations, how much time you think it will take to get it validated? Please elaborate.
Most respondents who operate measurement systems or measurement trains have in some way experience with validation and admission by a track-manager or independent third party. About half of the respondents have experience with validation for the Dutch regulations. Those who are not yet validated for the Dutch regulations, think that it would take 6 months to a year on average to obtain the admission once the system is build.	

3J	Do you have any other comments you would like to make?
The provided answers on this question are considered confidential and only for use by ProRail.	

2.4 Experience with logistics, planning and operation.

4A	Driving and operating a measurement vehicle requires specific driver skills. What experience do you have delivering drivers and/or locomotives for driving measurement train vehicles or other vehicles with deviating logistic demands?
Only a small number of respondents has experience as supplier of drivers and locomotives for driving a measurement train.	

4B	What experience do you have driving a locomotive in combination with measurement carriages for track condition monitoring (i.e., measurement runs)?
Only a small number of respondents has experience with driving a combination of locomotive and measurement carriage or driving a self-propelled measurement train.	

4C	What experience do you have with (re)planning measurement runs, including the required personnel? Do you have experience with the Dutch planning process as described in Appendix 3?
The experience with the planning of measurement runs is limited to the same respondents as in 4A and 4B. The experience with the Dutch planning process is even more limited to only the respondents who already operate in the Netherlands.	

4D	What experience do you have in the role of measurement drive leader, see section 1.4.3 of the RfI document?
Most of the respondents that are experienced with the execution of measurement runs have in experience with the roll of measurement drive leader in some way.	

4E	For the time being, the role of test drive leader is part of tender 3 (Logistics, Planning and Operation). What is your view on this? Please elaborate.
This is considered a possible risk by most respondents, because test drive leader should also have knowledge of the measurement systems.	

4F	What is a realistic lead time for the operational implementation of the requested tasks as described in point 1.4.3 of the RfI document?
Only a few respondents have given an answer to this question. In general, about up to 1 year is needed for the operational implementation.	

4G	Which contract duration do you prefer and what are your considerations?
Only a few respondents have given an answer to this question, where a duration of at least 5 years is mentioned as preferable. If investments are needed to purchase or modify specific locomotives a longer duration is necessarily to make the contract profitable.	

4H	Do you have any other comments you would like to make?
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2.5 Experience with consultancy and auditing.

5A	What experience do you have in maintaining a vision of measurement systems, measurements and validating measurement data?
About two-third of the respondents say they have experience with this.	

5B	What experience do you have in advising on the implementation of measurement systems? Which aspects play a role in this? Please elaborate.
Based on a generalisation of the given responses, the following aspects are mentioned: - Knowing what is critical when combining sensors and information - Have a view on requirements and know the requirements that are specific for the ProRail network (technical, operational). - Performing feasibility studies for new measurement systems	

5C	What experience do you have with the assessment of measurement systems for condition monitoring of the rail infrastructure? Which aspects play a role in this? Please elaborate.
Based on a generalisation of the given responses, the following aspects are mentioned: - Deep knowledge of the European regulations and the specific regulations and technical specifications of ProRail - Being able to store and manage data in a central system	

5D	What experience do you have in auditing the functioning of the entire monitoring chain as outlined in paragraph 1.4 (and/or parts thereof)? Which aspects play a role in this? Please elaborate

A limited number of respondents has experience with auditing. Several respondents have a partner for this kind of work.

5E	Do you have any other comments you would like to make?
The provided answers on this question are considered confidential and only for use by ProRail.	

2.6 Ultrasonic hand measurements (USH)

6A	Is your organization interested in carrying out ultrasonic hand measurements on the Dutch railway?
Only 4 respondents are interested in carrying out ultrasonic hand measurements	

6B	Does your organization have experience in performing ultrasonic manual measurements on rails inside or outside of Netherlands?
Several respondents have experience with ultrasonic manual measurements. Some only in the Netherlands, others only outside the Netherlands.	

6C	If you answered 'Yes' to the previous question, please indicate the size (number of hand measurements) of the assignments on an annual basis in the past five years.
The provided answers on this question are considered confidential and only for use by ProRail.	

6D	Which preconditions may apply to you, such as: availability of equipment and personnel, logistics, technical conditions and/or limitations to perform ultrasonic hand measurements on the Dutch railway.
The provided answers on this question are considered confidential and only for use by ProRail.	

6E	Do you have any other comments you would like to make?
The provided answers on this question are considered confidential and only for use by ProRail.	

2.7 Other

7A	What future developments do you see in the market of track monitoring?
Based on a generalisation of the answers: - Dedicated cloud systems for rail monitoring - Use of AI for analyses and interpretation of the data - Data-driven predictive maintenance and lifecycle management - Monitoring and measurement systems on in-service trains (passenger trains and freight trains)	

7B	Are there any other matters that you want to give to ProRail with the aim of putting the best possible tender(s) on the market?
The provided answers on this question are considered confidential and only for use by ProRail.	

7C	Which financial calculation model do you prefer? For example, per deployment, per measured kilometre, per kilometre of processed and accepted data. Please elaborate per tender as mentioned in sections 1.4.1 to 1.4.3 of the RfI document.
The provided answers on this question are considered confidential and only for use by ProRail.	

3 Questionnaire Part 2: Bridging

The questions below concern questions about the contracts mentioned in section 1.5 of the RfI document.

3.1 Ultrasonic track defects

For the scope of this agreement, see Table 1 of the RfI document. For the nature of the work, see Appendix 2.

8A	Are you able and interested in a bridging contract for the measurement of rail defects from 2028 to approximately 2029?
Initially, 4 parties stated a possible interest in a bridging contract for ultrasonic track defects. After the dialogue round, all parties that initially indicated that they were interested have revised their answer or did not convince ProRail that a short bridging contract is feasible without managing the beforementioned risks. Due to the high investment and start up costs, at this time only the current contractor seems to be able to fulfil the need of ProRail for a bridging contract regarding Ultrasonic track defects. Another party for a short bridging contract would lead to unacceptable risks for the core operation of ProRail. These risks are for example trend breaks, a long validation term, the validation requirements and the lack of ProRails capacity to carry out a validation process. Further research into the feasibility of a bridging with current contractor is required.	

8B	If you answered "Yes" to question 8A, please indicate which preconditions may apply to you, such as: minimum payback period, start-up costs, availability of equipment, technical conditions and/or limitations.
Some respondents state that the large investments needed can only be viable if the bridging contract has a much longer duration than the given 2 years.	

8C	If you answered "No" to question 8A, please indicate what your considerations are, such as: payback period, technical conditions, availability of equipment, and/or limitations, start-up costs.
In general, the respondents who answered “No” do not have the measurement of Ultrasonic track defects in their portfolio or the duration of the bridging contract is too short for a positive return on investment.	

3.2 ATB

For the scope of this agreement, see Table 1 of the RfI document. For the nature of the work, see Appendix 2.

9A	Are you able and interested in a bridging contract for the measurement of ATB from 2028 to approximately 2029?
Several respondents are interested in a bridging contract for the measurement of ATB.	

9B	If you answered "Yes" to question 9A, please indicate which preconditions may apply to you, such as: minimum payback period, start-up costs, availability of equipment, technical conditions and/or limitations.
Considering that ATB is a specific system for the Netherlands, not all interested respondents do have the equipment at the moment. Specific preconditions vary and are considered confidential.	

9C	If you answered "No" to question 9A, please indicate what your considerations are, such as: payback period, technical conditions, availability of equipment, and/or limitations, start-up costs.
In general, the respondents who answered “No” do not have the measurement of ATB in their portfolio or the duration of the bridging contract is too short for a positive return on investment.	

3.3 GSMR

For the scope of this agreement, see Table 1 of the RfI document. For the nature of the work, see Appendix 2.

10A	Are you able and interested in a bridging contract for the measurement of GSMR from 2028 to approximately 2029?
Several respondents are interested in a bridging contract for the measurement of GSMR.	

10B	If you answered “Yes” to question 10A, please indicate which preconditions may apply to you, such as: minimum payback period, start-up costs, availability of equipment, technical conditions and/or limitations.
The provided answers on this question are considered confidential and only for use by ProRail.	

10C	If you answered "No" to question 10A, please indicate what your considerations are, such as: payback period, technical conditions, availability of equipment, and/or limitations, start-up costs.
In general, the respondents who answered “No” do not have the measurement of GSMR in their portfolio or the duration of the bridging contract is too short for a positive return on investment.	

3.4 Track geometry and catenary.

For the scope of this agreement, see Table 1 of the RfI document. For the nature of the work, see Appendix 2.

11A	Are you able and interested in a bridging contract for the measurement of track geometry / catenary during 2029?
Several respondents are interested in a bridging contract for the measurement of track geometry / catenary.	

11B	If you answered "Yes" to question 11A, please indicate which preconditions may apply to you, such as: minimum payback period, start-up costs, availability of equipment, technical conditions and/or limitations.
Some respondents who answered “Yes” can only provide part of the scope of the bridging contract and need to find a partner to cover the complete scope of the contract.	

11C	If you answered "No" to question 11A, please indicate what your considerations are, such as: payback period, technical conditions, availability of equipment, and/or limitations, start-up costs.
In general, the respondents who answered “No” do not have the measurement of track geometry and catenary in their portfolio or the duration of the bridging contract is too short for a positive return on investment.	

4 Conclusions

Part 1 Modular Measurement Train

- The modular concept creates opportunities:
  - Flexibility
  - Companies are able to provide specialized services to ProRail instead of needing to provide a total package.
  - More efficient usage of available knowledge due to free market forces.
- The risks however are substantial:
  - Several suppliers on the same measurement hub;
  - ProRail is responsible for the interfaces between systems and demarcation in contracts;
  - ProRail doesn't have enough detailed knowledge of all separate aspects of the concept to be responsible for the interaction and functioning of all systems.
  - The performance of certain measurement systems is dependent on the dynamical behaviour of the measurement hub.
- Traction and logistics can be separated from the hub and measurement systems. This will create opportunities for other companies in the market. However, feedback on this topic section was limited. Further research may be needed:
  - Measurement hub and measurement systems in one contract means less risk and a shorter lead time form tender to operation.
  - Combining hub and measurement systems

Based on the responses on the questionnaire, ProRail will consider recommendations on the concept as published previously in the request for information.

Part 2 Bridging

There are sufficient parties to fulfil the scope of the bridging contracts ATB, GSMR and Track Geometry & Catenary.

Due to the lack of investment and start up costs, only the current contractor seems to be able to fulfil the need of ProRail for a bridging contract regarding Ultrasonic track defects. An other party for a bridging contract would lead to unacceptable risks for the core operation of ProRail. These risks are for example trend breaks, a long validation term, the validation requirements and the lack of ProRails capacity to carry out a validation process. Further research into the feasibility of a bridging with current contractor is required.