

Request for Information No. 2

Modular Measurement Train

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Used definitions

Nr	Concept / abbreviation	Betekenis (NL)	Meaning (UK)
1	ATB	Automatische treinbeïnvloeding	Automatic train influence: The Dutch signalling system
2	BAAN	Metingen die betrekking hebben op het spoor. Op dit moment bestaand uit: • Spoorgeometrie (D1, D2) • Spoorgeometrie korte golf (D0) • Spoorstaaf-dwarsprofiel • Spoorstaaf-langsprofiel • Spoorstaaf-oppervlaktebeeld • Baanvideo	Measurements that are performed on Track. Currently consisting of: • Track Geometrie (D1, D2) • Track Geometrie Short waves (D0) • Rail Profile • Longitudinal Profile • Track video (Top of Rail-view) • Track video (Driver-view)
3	BVL	Metingen die betrekking hebben op het spoor. Op dit moment bestaand uit: • Rijdraadligging • Pantograafcontact • Rijdraaddkte • BVL-video	Measurements that are performed on the Track. Currently consisting of: • Overhead wire position • Pantograph contact force • Overhead wire thickness • Overhead video
4	Deployment	Inzet van een meetvoertuig voor de duur van 8,5 uur met een uitloop naar 9 uur. Dit is exclusief transport naar startpunt van de meetrit en na afloop van de meetrit	Deployment of a measurement vehicle for 8.5 hours with an extension to 9 hours. This excludes transport to the starting point of the measurements and after the measurements
5	ERTMS	European Rail Traffic Management System, de Europese standaard voor treinbeveiliging- en besturing.	European Rail Traffic Management System, the single European signalling and speed control system
	FRMCS	Future Railway Mobile Communication System (digitale treinradio, opvolger van het huidige FRMCS)	Future Railway Mobile Communication System (digital train radio communication device, follow-up version of GSMR)
6	GaM	Goederentrein als Meettrein	Cargotrain as a measurement train
7	GSM-R	Global System for Mobile Communication – Rail (digitale treinradio)	Global System for Mobile Communication – Rail (digital train radio communication device)
8	HITS	Ultrasonen defecten gemeten met de meettrein	Ultrasonic defects measured by the measurement train
9	NCBG	Niet Centraal Bediend Gebied	Area not controlled by signalling
10	PVR	Profiel van Vrije Ruimte	Clearance profile
11	PVS	Permanente Vastlegging Spoor	Permanent Way Track Geometry
12	RaM	Reizigerstrein als Meettrein	Passenger train as a measurement train
13	Rfi	Request for information	Request for information
14	SPSTDEF	Spoorstaafdefecten	Internal track defects
15	SEB	Schoon en Emissievrij bouwen	Clean and Emission-Free Building
16	WaM	Werktrein als Meettrein	Work train as measurement train
17	WISI	Wisselinspectie en Spoorinspectie (metingen en video)	Switch and track inspection (measurements and video)

1 Introduction

Collecting condition data of railway assets is a crucial activity to determine the quality and safety of the railway infrastructure. ProRail is investigating the possibilities of entering contract(s) for these activities.

In November 2023 ProRail published a Request for Information (Rfi) in preparation for a possible tender for:

- (1) the development, realization and maintenance of the Modular Measurement Train (MMT),
- (2) the delivery, operation and maintenance of measurement systems,
- (3) carrying out measurement runs in the Netherlands and
- (4) auditing & consultancy.

The introduction and documentation that was included in the first Rfi is published with this second Rfi. For background information regarding the current way of working, measurement parameters and planning process we advise consulting the first Rfi.

This second RFI has two objectives:

- 1) Informing parties on ProRail's current setup concept for the Modular Measurement Train;
- 2) Asking feedback on a number of deciding choices in the current setup concept.

In order to align the requirements of ProRail and the possibilities of the market concerning condition monitoring of the Dutch rail infrastructure, ProRail would appreciate your contribution by completing this questionnaire.

Participants cannot derive any rights from the information stated in this Rfi. The project is still in preparation. Positions and principles may therefore be subject to change.

2 Setup concept for MMT

The insights on how to divide the complete scope of MMT into tenders have changed significantly since the information shared in and based on the outcome of RFI-1.

In RFI-1 we presented parties with possible splits of the total scope of work in up to 8 blocks:

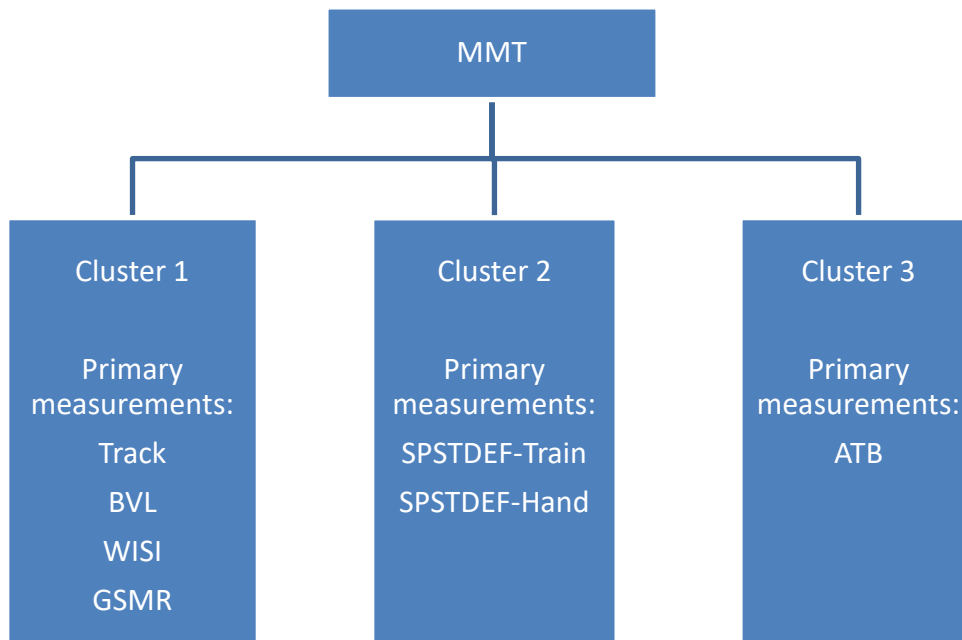
- Vehicle
- Traction
- Measurement systems
- Operation
- Logistics
- Acceptance
- ICT
- (integration) management

The original concept was that each block or group of these blocks could be contracted in separate contracts. In the documents we presented our setup at the time, the four possible tenders described at the top of this page.

Based on the insights gathered from RFI-1 and further research ProRail has decided not to split these blocks. Instead of this, ProRail has decided to divide the different groups of measurements to be performed into Clusters, where in each Cluster a contractor is responsible for all 8 blocks.

The auditing and consulting will not be part of (any of) the Clusters. This work may be contracted in a separate tender in the future, as well as other measurement systems. ProRail considers all tenders as Measurement as a Service. The ownership of the measuring equipment remains with the contractor.

The following Cluster setup has been defined:



2.1 Cluster 1: Modular Measurement Train

In this RFI 2, no questions are included concerning Cluster 1. If a third RFI will be published in the future, the relevant information about measurements and systems that can or will be part of Cluster one will be shared.

2.2 Cluster 2: Primary measurements: Track defects

ProRail intends to publish a separate tender for track defects. The primary measurements to be performed within this Cluster are:

- Rail defects

Key elements of these measurements are:

- Ultrasonic measurements with a running vehicle.
- A group of sensors per rail, looking at the rail under different angles and from different positions.
- Measurements from 4mm depth into the rail
- Maximum measurement distance is 3 mm at a measurement speed of 60 km/h
- All rail defect types specified in the European standards are to be detected
- High recognition rate and low level of false positives.
- High priority defects are directly routed to the hand measurement process for measurement within 24 hours.
- The B-scan is part of the delivery
- Schooled personnel (level defined in the European standards) performing the measurements.

- Rail surface defects

Key elements of these measurements are:

- Eddy current measurements with a running vehicle.
- A group of sensors per rail, looking at the rail surface from 20 mm on the inner side of the center of the rail through to 8 mm down from rail surface level in the gauge corner.
- Measurements up to 3 mm depth into the rail.
- Maximum measurement distance is 1 mm at a measurement speed of 60 km/h.
- All rail defect types specified in the European standards are to be detected.
- High recognition rate and low level of false positives.
- Schooled personnel (defined in the European standards) performing the measurements.

- Line scan pictures

Key elements of these scans are:

- Line scans from the top of the rail and the area left and right from the rail.
- (almost) fixed distance from the scan system to the top of the rail.
- Black and white scans, enough contrast to recognize the rail surface defects.
- Constant measurement distance, equal to or smaller than 1 mm at a measurement speed of 60 km/h.

- **Integral analysis of the obtained information from the above measurements.**

Key elements of this analysis are:

- o Fast integral analysis on the measurement data from all three sources on all defect types defined in the European standards.
- o High level of correct analysis.
- o Schooled personnel (level defined in the European standards) performing the analysis.
- o All relevant data from the measurements and the analysis to be delivered via automated processes into ProRail's ICT-system for this data.

- **Hand measurements: follow up on suspects from the integral analysis**

Key elements of these measurements are:

- o Ultrasonic measurements with hand equipment and visual inspection of the rail.
- o Goal of measurements is validation of the suspects found in the integral analysis.
- o A group of sensors, looking at the rail under different angles and from different positions.
- o Measurements from 4mm depth into the rail.
- o All rail defect types specified in the European standards are to be detected.
- o Very high recognition rate and low level of false positives.
- o Schooled personnel (level defined in the European standards) performing the analysis.

- **Hand measurements: Annual program of measurement on switches, bridges etc.**

Key elements of these measurements are:

- o Ultrasonic measurements with hand equipment and visual inspection of the rail.
- o Goal of measurements is defect detection on location where a (correct) vehicle measurement is not possible because of specifics of the rail (such as switches, beginnings and endings of bridges and compensation welds) or when there are tracks where a vehicle can not (effectively) get to.
- o A group of sensors, looking at the rail under different angles and from different positions.
- o Measurements from 4mm depth into the rail.
- o All rail defect types specified in the European standards are to be detected.
- o Very high recognition rate and low level of false positives.
- o Schooled personnel (level defined in the European standards) performing the analysis.

Expected specifics for this work

The following specific principles have been formulated:

- ProRail considers this tender as Measurement as a Service.
- Expected duration of the contract is approximately 15 years.
- Expected start of operation is 1-1-2030
- In the last years, ProRail annually spent approximately € 12.5 million on this contract, divided as follows:
 - 1) Vehicle measurement (roughly 14K km of track per year), integral analysis and hand measurements as follow up on suspects found during the integral analysis: € 9 million.
 - 2) Annual program of measurement on switches, bridges etc: € 3.5 million.
- During the 15 year period of the contract, ProRail expects vehicle measurements to stay approximately at the same level and hand measurements to decrease due to technological progress.

For this tender, contractor will be responsible for:

- Development or obtainment of a measurement vehicle and equipment for hand measurement including certification and approval of the vehicle and all measurement systems for the Dutch railway.
- All preparations (technical, processes, ICT, reporting etc) for vehicle measurement, integral analysis and hand measurement in accordance with the contractual demands.
- Maintenance and calibration of the measurement systems;
- Performing acceptance tests in accordance with ProRail demands on the measurement methods, process and results.
- Performing the annual program of vehicle measurements, integral analysis and hand measurements.
- Providing all results of the measurements and analysis to ProRail (measurement data, analysis data, calibration reports, financial and administrative documents).

ProRail wants to have some questions answered about the specifics of this Cluster and has prepared a questionnaire for this, see Appendix 1.

2.3 Cluster 3: Primary measurements: ATB

ProRail intends to publish a separate tender for measurements on the ATB.

ATB is a Dutch safety system, supplying information in the rail about the maximum speed for a section of track to a train running over this section of track. A current is put through the rail with a specific character (frequency and modulation) which can be read by a sensor mounted on a train. This sensor has to be positioned in front of the first axle of the vehicle. By reading the specific character of the signal the ATB-system tells the driver what the maximum speed is.

This current and its specific character has to be monitored. This can only be done with a train which has a sensor mounted in front of its first axle. This sensor for measuring also has to be in front of the sensor with which the train speed is controlled or an integrated solution has to be worked out (and get certificated) in which the same sensor performs both functions.

The primary measurements to be performed within this Cluster are:

- **ATB-Signals**

Key elements of these measurements are:

- ATB current characteristics with a running vehicle.
- Sensors in front of the first axle of the vehicle
- Readout and recording of the signals of the sensor (modularity/duty cycle, amplitude, frequency)
- Measurements have to be performed without on-vehicle attendance during operation.
- Maximum measurement speed 140 km/h
- High recognition rate and low level of false positives.
- High priority issues in the signals are directly routed to ProRail.

Expected specifics for this work

The following specific principles have been formulated:

- ProRail considers this tender as Measurement as a Service.
- Expected duration of the contract is approximately 15 years.
- Expected start of operation is 1-1-2028
- In the last years, ProRail annually spent approximately € 500.000 for this contract.
- During the 15 year period of the contract, ProRail expects the volume of measurements to decrease significantly because the ATB-system will be replaced with the ERTMS-system

in the next 20 to 30 years so less and less railway lines will be controlled with ATB. ProRail will possibly include a provision to compensate turnover decrease.

For this tender, contractor will be responsible for:

- Obtainment or preparation of a measurement vehicle and equipment for ATB-measurement.
- All preparations (technical, processes, ICT, reporting etc) for vehicle measurement, in accordance with the contractual demands.
- Maintenance and calibration of the measurement system;
- Performing acceptance tests in accordance with ProRail demands on the measurement methods, process and results.
- Performing the annual program of vehicle measurements.
- Providing a monthly report to ProRail.

ProRail wants to have some questions answered about the specifics of this Cluster and has prepared a questionnaire for this, see the Appendix 3.

Possible addition to Cluster 3: GSMR/FRMCS

In the questionnaire there are some questions about the possible addition of GSMR/FRMCS measurements. Information about this is listed below:

GSMR is ProRail's current system for the communication between train drivers and ProRail's train control centre. To prevent situations where a train driver can not get in contact with the train control center (fast enough), the quality of the communication has to be checked. For this, a measurement system has to be installed on a vehicle. ProRail owns several of these systems, which come in two types: the full type and the compact type. In the next 10 years, the GSMR will be replaced by FRMCS, the new system for this communication. For a number of years, both systems have to be installed on same vehicle. Specifics for these systems are:

GSMR/FRMCS – Full:

- Measurements on GSMR/FRMCS with a running vehicle.
- Systems (antenna, cables, measuring unit etc) supplied by ProRail
- Antennas to be installed on the roof of the vehicle. Required available roof length approximately 20m.
- 2 19" cabinets for the measurement units, both with a total wattage of 610 Watt, each a total height of 1.8m
- Measurements to be performed with on-vehicle attendance during operation. Personnel hired by ProRail will perform the measurements.
- Workspace needed for personnel.
- Maximum measurement speed at least 140 km/h

GSMR/FRMCS – Compact:

- Measurements on GSMR/FRMCS with a running vehicle.
- Systems (antenna, cables, measuring unit etc) supplied by ProRail
- Antennas to be installed on the roof of the vehicle. Required available roof length approximately 3m.
- 2 19" cabinets for the measurement units, both with a total wattage of 610 Watt, each a total height of 0.6m
- Measurements to be performed without on-vehicle attendance during operation.
- Maximum measurement speed at least 140 km/h

Expected specifics for this work

The following specific principles have been formulated (additional to those for ATB):

- In the last years, ProRail annually spent approximately € 500.000 on this contract.
- During the first 5 to 8 years of the contract, ProRail expects the volume of measurements to increase due to the tests on the new FRMCS system.

For this additional work, contractor will be responsible for:

- Obtainment or preparation of a measurement vehicle and equipment fit for GSMR/FRMCS-measurement.
- Installing the antennas and cables according to the specifics supplied by ProRail.
- Allowing and supporting access to the vehicle for the personnel hired by ProRail for maintenance, tests and repair.
- Performing the annual runs so the personnel hired by ProRail can perform the GSMR/FRMCS measurements.

3 Possible additional measurements

ProRail intends to extend the contract in each Cluster with one or more extra measurements to be performed. This could be an arrangement from the start of operation for a Cluster, or at a later moment during the contract period. In the questionnaire possible contractual formats for these extension are described.

The measurements listed in this chapter are examples of these possible extensions.

- **Ballast and track bed**

Key elements of these measurements are:

- Ground penetrating radar measurements with a running vehicle.
- A group of radars, tracking the materials/layers und the track from different positions above the track
- Measurements up to 2m under the track
- Layers of different density and materials are to be detected
- Maximum sampling distance 3 mm at a measurement speed of 120 km/h
- Measurements to be performed without on-vehicle attendance during operation.
- Results to be delivered to ProRail for further analysis and sample drilling

- **PVR - Clearance profile**

Key elements of these measurements are:

- 3D-scans recorded with a running vehicle.
- Detection of all objects surrounding the track.
- Absolute positioning of all detected objects
- Maximum sampling distance 7 mm at a measurement speed of 80 km/h
- Measurements to be performed without on-vehicle attendance during operation.
- Results to be handed over to ProRail for further analysis.

- **PVS - Permanent Way Track Geometry**

Key elements of these measurements are:

- Measurement of bolts connected to the masts and of other fixed points near the track with a running vehicle
- High precision on absolute positioning of all measured points
- Measurements to be performed without on-vehicle attendance during operation.
- Results to be handed over to ProRail for further analysis.

- **Track quality**

Key elements of these measurements are:

- Acceleration measurements with a running vehicle.
- Measurements of vertical acceleration on axle level of the vehicle
- Sample frequency up to 200 Hz at a measurement speed of 120 km/h
- Measurements to be performed without on-vehicle attendance during operation.
- Results to be delivered to ProRail for further analysis

- **GSMR/FRMCS – Compact:**

- Measurements on GSMR/FRMCS with a running vehicle.
- Systems (antenna, cables, measuring unit etc) supplied by ProRail
- Antennas to be installed on the roof of the vehicle. Required available roof length approximately 3m.
- 2 19" cabinets for the measurement units, both with a total wattage of 610 Watt, each a total height of 0.6m
- Measurements to be performed without on-vehicle attendance during operation.
- Maximum measurement speed at least 140 km/h

4 Procedure RfI

4.1 Introduction

As mentioned before by means of this RfI, ProRail intends to obtain answers to a number of questions from the contractors in the market, so that on this basis, it can position the possible tender(s) better in the market. In addition, it tries to reach as many contractors as possible in order to interest them and encourage them to contribute ideas.

This RfI will primarily focus on Clusters 2 and 3. For both Cluster 2 (Track Defects) and Cluster 3 (ATB) a separate questionnaire has been included. In the (near) future ProRail might publish a third RfI with focus on Cluster 1.

4.2 Procedure

This RfI is published on TenderNed, which means all eligible suppliers can participate. This is a written procedure with an optional dialogue. You are requested to fill in the enclosed questionnaire and submit it before the date mentioned in paragraph 4.3. You can state your answers in Dutch or English. If answers are unclear, raise questions or need further explanation, ProRail reserves the right to ask for clarification in the dialogue round. If you are interested, please send your answers to the questionnaire (Appendix 2 and/or 3) to arno.odijk@prorail.nl, no later than 19th May 2025 12:00 CEST.

An anonymous report is made of the total RfI. Excluded from mentioning in the final report are explicitly stated confidential answers of participants and information that is, in the opinion of ProRail, confidential. All questions regarding finances are considered confidential. The RfI will be completed by drawing up a final report via TenderNed. The final report will be part of the tender documents for the European tender, if ProRail decides to publish a European tender.

4.3 Planning

Date	Activity
28 th April 2025	Publication on TenderNed
8 th May 2025	Deadline and time for asking questions about the RfI procedure
13 th May 2025	Deadline for answering questions via the Information Memorandum (by ProRail)
19 26 th May 2025 12:00 CEST	Deadline and time for submitting your completed Questionnaire by email (arno.odijk@prorail.nl)
May 2025	Dialogue / clarification (optional)
June 2025	Reporting

4.4 Open and honest

Participation in the RfI is completely voluntary and will not lead to any privileges in a tender. Likewise, not participating in the market consultation will not lead to exclusion from a possible tender. By participating in this RfI, you agree that the information you provide may be used by ProRail in (the preparation of) the tender. Commercial (numerical) information provided by you will be treated confidentially by ProRail. ProRail values a transparent process. It is not the intention to favor participating market parties in the RfI or to place non-participating parties at a disadvantage. From this perspective, all relevant information resulting from the market consultation will be made available to all potential tenderers upon publication of the tender or added to the tender dossier. Any costs for participating in this market consultation will not be reimbursed.

5 Appendices

The following appendices (separately attached) are part of this RfI:

1. Appendix 1 – Information RfI 1 (November 2023)
2. Appendix 2 – Questionnaire Cluster 2 - Track Defects
3. Appendix 3 – Questionnaire Cluster 3 - ATB