National Implementation Plan of ERTMS in The Netherlands

1. Decision making process

April 2014: Preference decision

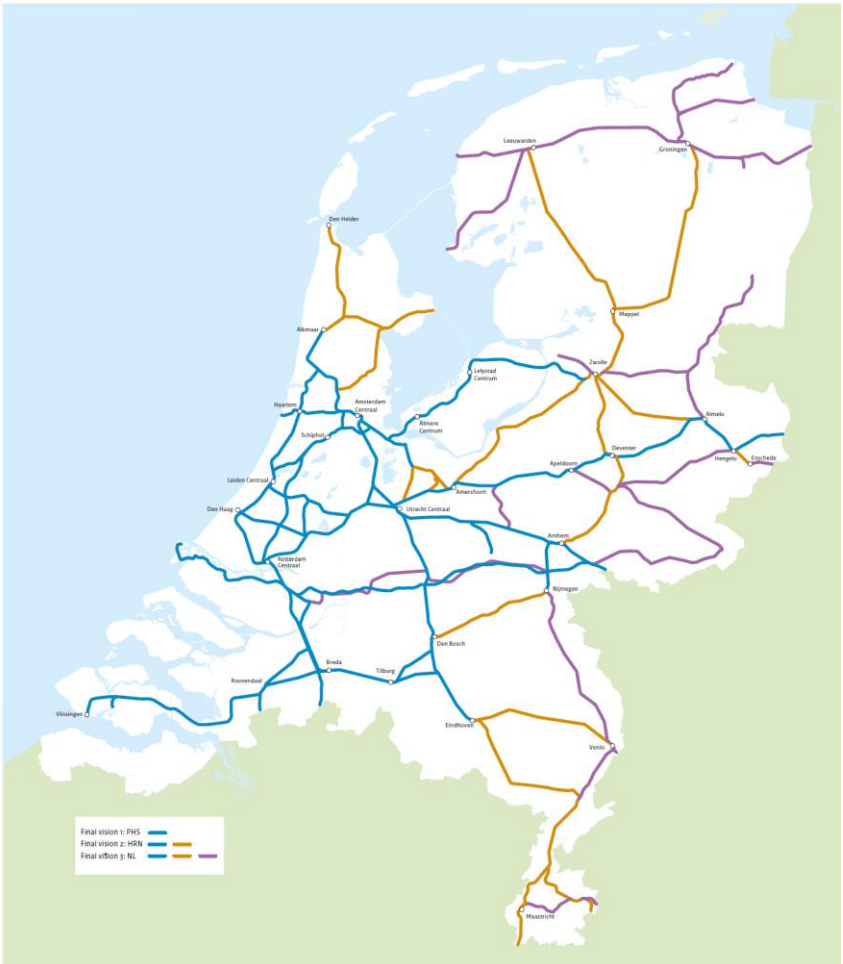
In April 2014 the Dutch Parliament agreed with the Dutch Government to implement its' preferred scenario for ERTMS; Level 2 on the railway network in large parts of the broader 'Randstad' in the period up to 2028. ERTMS will replace the existing Class B system in the infrastructure. ERTMS as single system implies that on forehand all of the existing rolling stock that uses the Dutch railways has to be retrofitted with ERTMS on-board equipment. A budget of € 2.4 mlrd is reserved. The ERTMS program falls under the Major Project procedure, which means that the Parliament is reported about the progress twice a year.

The 'Preference Decision' is motivated in the report Railmap 3.0. The report is available at internet: https://www.government.nl/binaries/government/documents/reports/2014/04/01/railway-map-ertms-version-3-0-memorandum-on-alternatives/railmap-3-0-engels.pdf

In the report various scenario's are presented, which have been investigated. The figure below shows the scope of the three (main) senario's:

1. PHS: The western part of the Network including the TEN-T connections.
2. HRN: The major network for which NS (Dutch incumbant) has a concession
3. NL: The whole infrastructure of Inframanager ProRail.

Figure 5. Division of railway infrastructure in scenario areas



Cost /benefit analyses

The scenario's show a benefit/cost ratio above 1,0. The main benefit results from the capacity gain of ERTMS level-2. Although ERTMS at the whole network shows the highest ratio the scenario nr. 1 of PHS has been chosen as preference. The PHS network is asking most urgently for capacity extension and ERTMS can offer this. In their decision the Dutch Government made a budget reservation of € 2,4 mlrd, which enables the roll-out of ERTMS on the PHS network. Full coverage should require an amount of about € 5 mlrd.

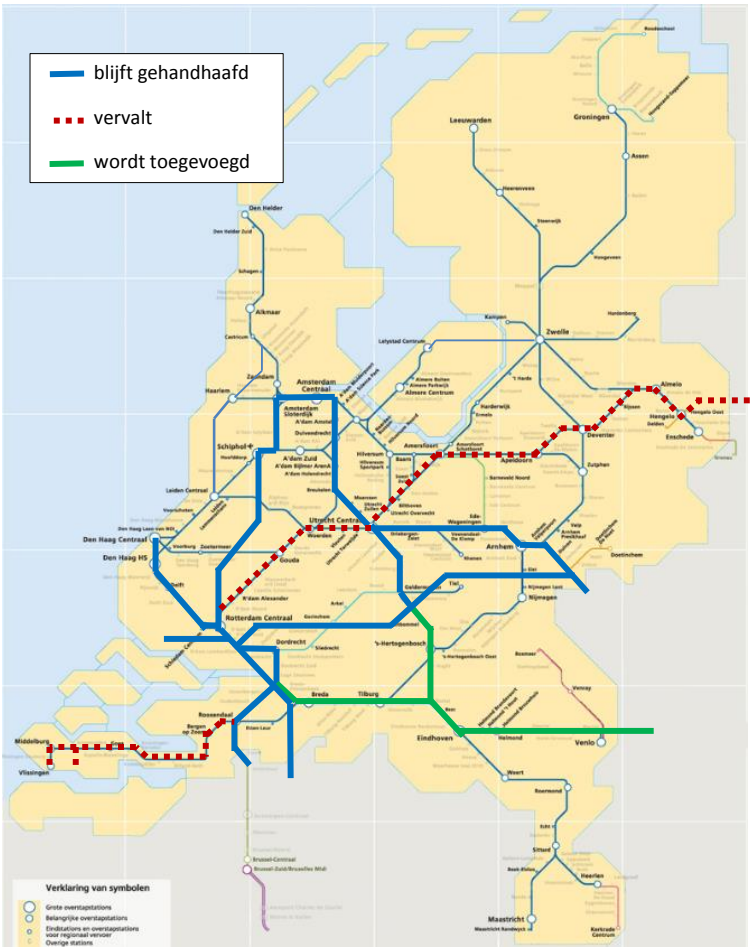
MKBA	Final visions		
	1: PHS	2: HRN	3: NL
Benefits			
Journey time gains passengers	1,104	1,289	1,288
Journey time gains freight	21	27	25
Reliability benefits passengers	90	159	200
Gains for operation	212	354	375
Delays for car traffic at level crossings	57	108	136
Indirect effects	191	237	247
External effects	*96*	*115*	*116*
Costs			
Investment costs infra	*-1,418*	*-1,881*	*-2,035*
Investment costs rolling stock	*-363*	*-410*	*-409*
Avoided investments	*215*	*215*	*215*
Management and maintenance infra	*-278*	*-394*	*-452*
Management and maintenance rolling stock	*-263*	*-179*	*-169*
Replacement costs	*291*	*383*	*455*
Balance			
Benefits	*1,770*	*2,290*	*2,388*
Costs	*-1,815*	*-2,266*	*-2,395*
Balance benefits costs	*-46*	*24*	*-7*
Benefit/cost ratio	*1.0*	*1.0*	*1.0*

June 2016: Update ERTMS roll-out infrastructure

Based on comments of stakeholders the preference decision of 2014 has been amended during 2016 In 2016 railfreight operators asked for ERTMS at the connection to Germany between Rotterdam and Venlo via Eindhoven. This line is an important diversionary route for the Betuweroute and the traffic of the Rhine-Alpine corridor. For the sake of interoperability this line has been included in the Roll-out programma 2024-2028. The planned date for the implementation of ERTMS at the line Rotterdam-Venlo is actually estimated at 2027.

In 2016 the program organization, which has been raised after the preference decision, made a detailed analyses of the cost/ benefit ratio's for each section of the network separately. The analyses shows that the lines between Roosendaal and Flushing as well as the line between Amersfoort and Hengelo are performing negative in terms of cost/benefit. As a consequence the priority of these two lines has been adapted and postponed till the period after 2028.

The figure below shows the amendments made to the preference decision. The dotted lines have been replaced by the green lines. As a result the blue lines and the green ones represent the actual roll-out plan of ERTMS in the Dutch infrastructure during 2024-2028.



2018: Project Decision

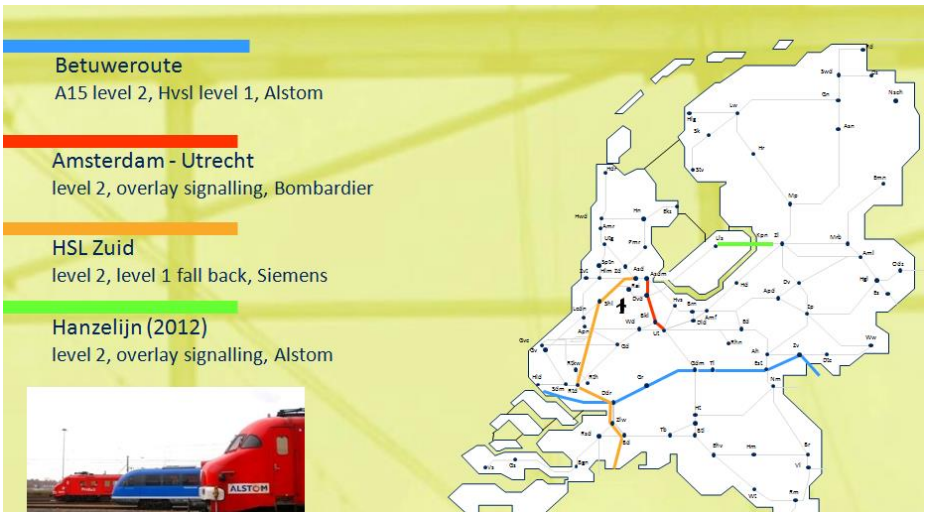
The updated roll-out plan among many other documents is incorporated in the Project Decision. The preplanning of the preference decision has been elaborated during 2015 and 2016. Decisions have been prepared concerning tendering, development of STM-ATB, financial support for retrofitting rolling stock, operational impact, engineering, testing and governance of the realization project. In 2017 all documents are being reviewed and finally will be offered to Parliament in 2018. The final decision on the implementation of ERTMS will then be taken.
A summary of the project decision is explained in the paper called Railmap 4.0. This document will be forwarded to the Commission as soon it is published. The railmap describes all items for defining the scope of the project. After the approval of the project decision the ERTMS programme organization will change into a project organization.

The roll-out planning between 2024 and 2028 is presented in the figure below. The sequence of all lines of the Dutch network are represented in the table as well. The sequence of the ERTMS in the infrastructure is in line with the information as presented to the Commission during the revision of the European Deployment December 2016.

	Perceel Noord			Perceel Zuid	
N01	Haarlem e.o.	2024	Z01	Kijfhoek - Roosendaal - Grens	2024
N02	Leiden - Den Haag	2025	Z02	Roosendaal - Den Bosch	2025
N03	Leiden - Hoofddorp - Duivendrecht	2026	Z03	Meteren - Eindhoven	2026
N04	OV SAAL	2027	Z04	Utrecht - Meteren	2027
N05	Asd Centraal	2029	Z05	Utrecht	2028
N06	Hilversum - Utrecht/Amersfoort	2028	Z06	Eindhoven - Venlo - Grens	2027
N07	Utrecht - Amersfoort	*2029**	Z07	Utrecht - Arnhem	*2029**
N08	Amersfoort - Zwolle	*2030**	Z08	Arnhem - Zevenaar	*2030**
N09	Zwolle	*2031**	Z09	Arnhem - Nijmegen	*2030**
N10	Zwolle - Meppel	*2032**	Z10	Rotterdam	*2031**
N11	Rotterdam - Utrecht	*2033**	Z11	Den Haag - Rotterdam	*2031**
N12	Den Haag - Gouda	*2034**	Z12	Vlissingen - Roosendaal	*2032**
N13	Leiden - Gouda e.o.	*2035**	Z13	Venlo - Roermond	*2033**
N14	Alkmaar - Amsterdam	*2035**	Z14	Roermond - Sittard	*2033**
N15	Meppel - Groningen	*2035**	Z15	Nijmegen - Venlo	*2034**
N16	Meppel – Leeuwarden	*2036**	Z16	Merwede-Lingelijn	*2035**
N17	Amersfoort – Barneveld	*2037**			
N18	Barneveld – Deventer	*2037**			
N19	Deventer- Duitse grens	*2037**			
N20	Barneveld – Ede Wageningen	*2038**			

Harmonisation of existing ERTMS tracks.

As one of the frontrunners in deploying ERTMS in 2007 (high speed line to Belgium and Betuwe freightline to Germany) the existing ERTMS tracks in The Netherlands differ in engineering and consequently in operational rules.



The harmonization of these ERTMS lines is included in the National implementation plan. In 2018 the ERTMS infra at the highspeed line Amsterdam-Antwerp will be upgraded in order to be fit for purpose for the future baseline 3 vehicles. The authorization of ERTMS vehicles in future will benefit from the harmonization of the ERTMS infrastructure. One set of interoperability tests will be sufficient in 2024 to get a license for the Dutch network. No longer separate tests procedures for each project are required.

The existing baseline 2 tracks will be assessed against the Baseline Compatibility Assessment of the ERA. If necessary mitigation measures may be implemented to ensure compatibility with B3 trains. The new ERTMS infrastructure as from 2024 is the version 3.6.

The engineering rules for the baseline 3 ERTMS infrastructure have been developed in cooperation with the engineering companies, which are familiar with the Dutch network. The existing ERTMS lines will be aligned with the new engineering, which enables the traindrivers in future to run on the Dutch network with one set of operational rules.

Decommissioning of Class B system

As explained the ERTMS plan does not cover the whole infrastructure of The Netherlands. The budget of 2,4 mlrd. is available for the roll-out of ERTMS at the TEN-T lines and the high density lines in the Western part of the country. A target date at which the actual class B system can be decommissioned is not planned. For the time being the class B system will be necessary in the rolling stock if authorization for the whole the network is requested.

The program is developing a STM-ATB module. This knowledge becomes available for the suppliers of the ERTMS on-board units.

STM-ATB

The passenger fleet will need a STM-ATB module anyhow. The fleet of NS is running nationwide and crosses infrastructure without ERTMS for a long time. The trains will have to be dually equipped because these run over infrastructure with only ERTMS either only Class B.

Freight traffic may be able to run without Class B on-board as from 2027. Then the connection between Rotterdam and Germany (via Venlo) becomes operational under ERTMS. This line is an alternative route in case the Betuweline (via Emmerich) is out of service. With two ERTMS connections between Rotterdam and the Rhine Alpine corridor the freight operators can enter the Dutch territory with just only ERTMS on-board. The class B system is then no longer required. The option to enter via ERTMS lines to Rotterdam will be made legally possible by offering route specific authorization.

Retrofitment Rolling stock

Rolling stock on the TEN-T network must have ERTMS on-board equipment. According TSI-CCS baseline 3 is required as from 1st of jan 2019. In near future this obligation will be made applicable for all rolling stock, which wants to be authorized at the Dutch network in2024.

In order to have sufficient ERTMS trains available at the time the first B3 line comes in operation in 2024 almost the whole fleet of NS has to be retrofitted. The costs of the retrofitment of the operators of Public services are mostly covered by the government.

Upgrade of ERTMS in freight locomotives

The implementation of ERTMS on the Kijfhoek-Roosendaal line in 2024 requires Railway Undertakings to upgrade their existing ERTMS equipment to baseline 3. ERTMS as a system is showing a positive business case. Nevertheless ERTMS investments in OBU's cannot be commercially justified by the RU's. ERTMS is a signaling system in addition to the national class B system. As long as the locomotives are running in dual mode there are no benefits of the ERTMS investment. Revenues can only be expected after full operation of ERTMS on the corridors of the TEN-T network in the EU. The ministry therefore offers national funding in addition to CEF funding, which has been applied for in july 2017. IenM and the RU's have agreed a mutual understanding for the project along the following milestones:

- Start project team 01/01/2018
- procurement B3-upgrade frame work contracts 01/07/2018
- endorsement procedures for design of B3 –upgrades 01/01/2020
- acceptance of certification of IC's and CCS subsystems provided by the suppliers 01/01/2021
- ERA authorization of the prototype for RFc1 and Rfc2 corridors provided by the suppliers 31/12/2021
- Start serial B3 upgrades 01/01/2022
- Complete acceptance of serial B3 upgrades 31/12/2023

The project covers the authorization of the prototype in the Member States of the Rhine-alpine corridor (NL,B,G, CH and I) and 300 locomotives of various types. A cooperation with the North Sea- Med corridor will be established in order to include France in the process. The number and types of locs to be upgraded are shown in the table.

CEF 2017 Blending call 27581847:
participants NL B3 upgrade of international cross border freight locomotives

ETCS supplier / locomotive type		**Participating Owners**					
Electrical locomotives							
Siemens/Alstom	**Configuration**	**DB Cargo**	**MRCE**	**Locon AG**			
BR189/ES64F4	DE/NL – DE/NL/AT/ CH/IT	60	67	2			**129**
Bombardier		**Alpha Trains**					
TRAXX MS	DE/AT/NL/BE	55					**55**
Diesel locomotives							
Bombardier		**DB Cargo**	**LTE**				
6400	DE/NL	22	2				**24**
Bombardier		**BeaconRail**	**CrossRail**				
Class66	DE/NL/BE	27	10				**37**
Alstom		**RRF**	**Spitzke**	**Captrain**	**Shunter**	**Locon AG**	
BR203	DE/NL	9	1	4	1	1	**16**
Alstom		**Alpha Trains**	**NorthRail**	**RTB**	**Strukton**		
G1206	DE/NL	8	11	2	1		**22**
Alstom		**Alpha Trains**	**RTB**				
G2000	DE/NL	14	3				**17**
						Total	**300**