

# ERTMS



Jernbaneverket


## National implementation plan





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## 1 Introduction

The Norwegian National Rail Administration (Jernbaneverket) intends to implement the European Rail Traffic Management System (ERTMS) on the Norwegian railway network.

This document describes the planned ERTMS implementation. The sequence for roll-out is aligned with both the need for renewals of signalling systems and the need for new systems when new railway infrastructure is built. The planned implementation of ERTMS also includes fitting/retrofitting of trains with ERTMS.

The whole Norwegian railway network will be in service with ERTMS by 2030. The speed of the rollout is aligned with the financing given in the National Transportation Plan 2014-2023 (NTP). GSM-R has been in service on the complete network from 2007.

## 2 Background

The driving force for implementing ERTMS in Norway is the need for renewal of signalling systems more than the need for interoperability. When renewing old - or building new - signalling systems the European standard system ERTMS was chosen based on TSI requirements and cost/benefit analysis.

## 3 Purpose

Norway has signed an agreement with the European Union named EEC (European Economic Community), which regulates the cooperation between Norway and EU. Through this agreement directives from the European Commission are implemented into Norwegian law. TSIs (Technical Specification for Interoperability) are part of EU directives. Implementation of ERTMS is in accordance with the technical specification for interoperability control-command and signalling (TSI CCS, Commission Decision 2012/88/EU changed by decision 2012/696/EU), implemented in Norwegian law with "Forskrift om TSI-styring, kontroll og signal, jernbane". "Jernbaneinfrastrukturforskriften" states that new or rebuild signalling systems on the Norwegian railway network shall have interface to Class A systems (ERTMS).

The implementation plan specifies both order and time period for the roll-out of ERTMS on the network. This document is an extract from Jernbaneverket's national signal plan the document "Nasjonal signalplan" (document number IUP-00-A-04278), which provides further details on the basis for the implementation plan.

The implementation plan has been synchronized with the current Swedish ERTMS plan in order to facilitate interoperability.

## 4 Scope

The target is to implement ERTMS on the complete national railway network. The plan presumes that ERTMS level 2 will be used, and that the existing GSM-R network will be used for communication between train and infrastructure.

When ERTMS is implemented in Norway, the existing rolling stock will have to be modified. A total of approximately 600 vehicles of 83 types will have to be equipped.

## 5 Financing

The total cost of the Norwegian ERTMS implementation is estimated to be between 1,7 and 2,2 billion Euros. In the period 2014-2023, a total of 6 billion NOK (750 million Euros) has been allocated in the National Transportation Plan to the ERTM implementation.

The Norwegian implementation plan is not based on any EU subsidies.

The existing rolling stock will have to be modified. The modification cost represents a burden for the railway companies. It is not yet decided how the financing of the modification work of the rolling stock will be done.

## 6 Assumptions

The plan is built on the following assumptions:

- It is assumed that the ERTMS suppliers are able to meet Jernbaneverkets stated implementation scope, progress and cost targets given that contracts are signed in due time to deliver.
- The financing and contract/procurement strategy for on-board equipment are assumed not to influence the implementation order.
- Currently planned new infrastructure projects are carried out according to existing plans.

## 7 Migration strategy

There are two possible strategies for implementing ERTMS. Either trains or infrastructure can be “double” equipped with both ERTMS and the national Class B system at the same time. The two strategies are named the rolling stock strategy and the infrastructure strategy. Jernbaneverket has concluded that the rolling stock strategy will be the most suitable and resource efficient solution for implementing ERTMS in Norway.

### 7.1 Rolling stock

The rolling stock strategy has the impact that all trains that operate on a line equipped with ERTMS must be fitted with ERTMS. If the same trains also operate on lines equipped with the national Class B system, a Specific Transmission Module (STM) will be required in the train. The national Class B system in Norway is Ebicab 700. To ensure that lines can be put into service with ERTMS as planned, fitting/retrofitting of trains with ERTMS/STM and training of drivers has to be coordinated with this implementation plan.



## **7.2 Infrastructure**

Frequent changes between different operational modes (ERTMS/STM) should be limited to minimize stress on train drivers. The plan regards this by implementing ERTMS line by line and continuous. To minimize impact on the railways customers when putting ERTMS into service, a detailed migration plan will be made available.



## 9 ERTMS plan

The figure below shows the Norwegian ERTMS implementation plan.

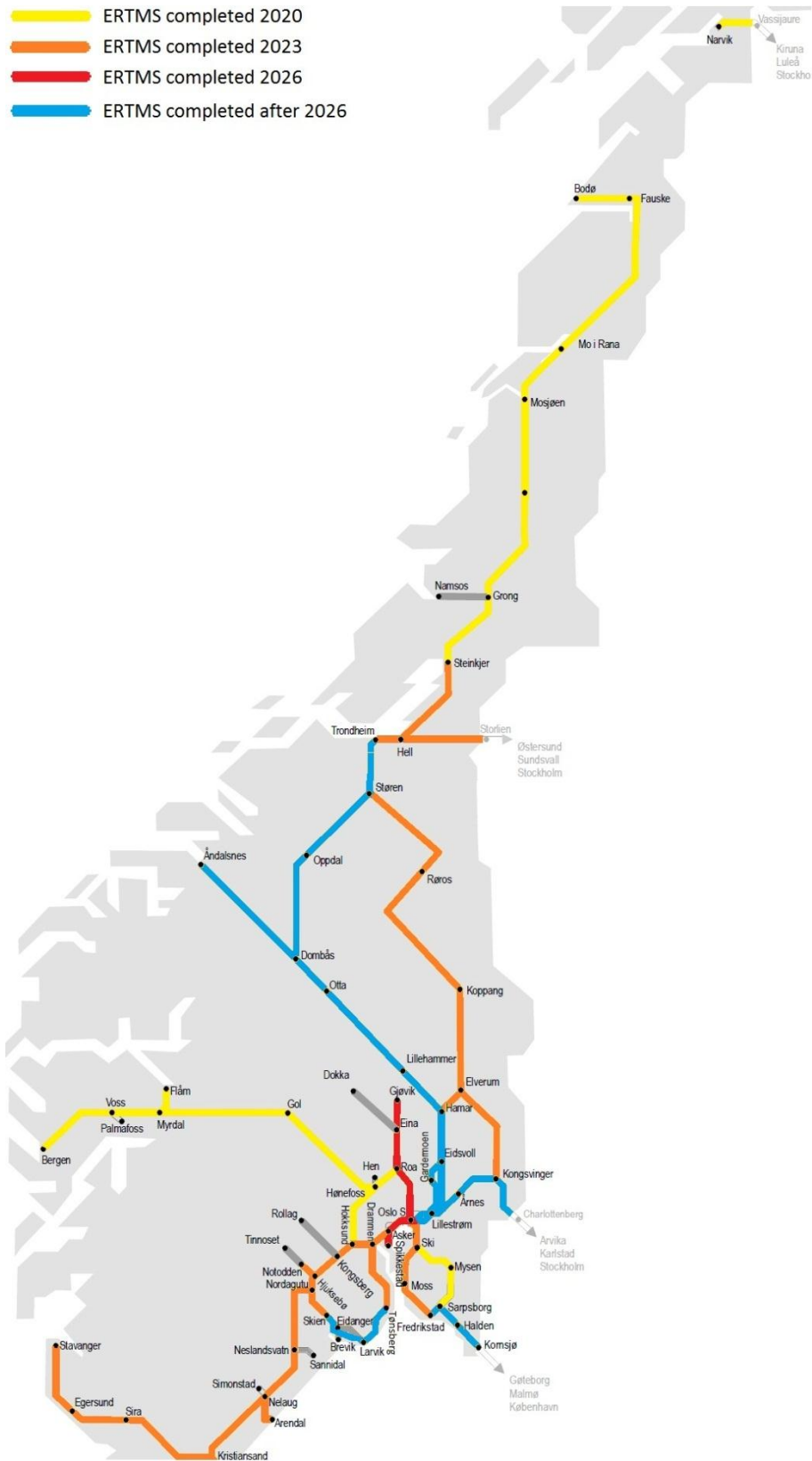


Figure 2: Norwegian ERTMS implementation plan.



